VOLUME 20 / NUMBER 8
APRIL 23, 1982
ACC. NOS. N82-17083 TO N82-18118

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

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Scientific and Technical Aerospace Reports, Volume 20, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through March 31, 1982.

US ISSN 0036-8741

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Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

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90 ASTROPHYSICS **1162**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **1164**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **1165**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **1166**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **1166**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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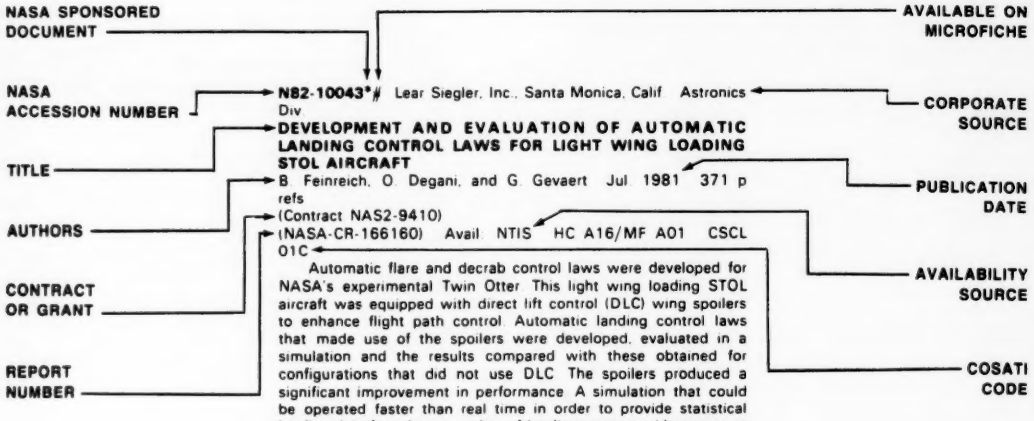
TYPICAL CITATION AND ABSTRACT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NASA ACCESSION NUMBER
N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
CORPORATE SOURCE
TITLE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
PUBLICATION DATE
AUTHORS
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
CONTRACT OR GRANT
(Contract NAS2-9410)
AVAILABILITY SOURCE
REPORT NUMBER
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C
COSATI CODE
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 8/APRIL 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-17083*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN EXPERIMENTAL STUDY OF AIRFOIL ICING CHARACTERISTICS
Robert J. Shaw, Ray G. Sotos, and Frank R. Solano 1982 37 p refs Presented at Twentieth Aerospace Sci. Conf., Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(NASA-TM-82790; E-1114) Avail: NTIS HC A03/MF A01 CSCL 01B

A full scale general aviation wing with a NACA 63 sub 2 A415 airfoil section was tested to determine icing characteristics for representative rime and glaze icing conditions. Measurements were made of ice accretion shapes and resultant wing section drag coefficient levels. It was found that the NACA 63 sub 2 A415 wing section was less sensitive to rime and glaze icing encounters for climb conditions. E.A.K.

N82-17084# Federal Aviation Administration, Washington, D.C.
CENSUS OF US CIVIL AIRCRAFT, CALENDAR YEAR 1980 Annual Report, 31 Dec. 1980
31 Dec. 1980 275 p
(AD-A106675; AMS-220) Avail: NTIS HC A12/MF A01 CSCL 01/3

Information about the U.S. Civil aircraft fleat is presented. Tables of air carrier aircraft and an inventory of registered aircraft by manufacturer and model, and general aviation aircraft by state and county of the owner are included. GRA

N82-17085# Institute for Defense Analyses, Arlington, Va. Program Analysis Div.
BUILT-IN-TEST EQUIPMENT REQUIREMENTS WORKSHOP. WORKSHOP PRESENTATION Final Report, 1 Oct. 1980 - 28 Feb. 1981
Aug. 1981 235 p refs Workshop held at Arlington, Va., 11-13 Feb. 1981
(Contract MDA903-79-C-0320)
(AD-A107842; AD-E500460; IDA-P-1600) Avail: NTIS HC A11/MF A01 CSCL 09/3

A workshop was held for the purpose of assessing progress and problems in specifying and testing Built-In-Test (BIT) used in complex electronic equipment. The workshop's principal recommendation is that the current specification and test approach be broadened to include all capabilities associated with the detection and isolation of faults. Current practices generally address only a narrow subset of these capabilities, namely, BIT. The workshop participants defined this broad capability as '100 Percent Diagnostics.' The diagnostic capability is considered to have two components--'automatic' and 'manual.' The automatic component consists of BIT or semi-automatic BIT with technical manuals, while the manual component consists of personnel using logic, external test equipment and/or manual test procedures. Observations on current experience with BIT, recommendations to improve specification and testing of '100 Percent Diagnostics' that can be put into practice in the near term, and proposed research areas are presented. GRA

N82-17086# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TACTICAL AIRBORNE DISTRIBUTED COMPUTING AND NETWORKS
Oct. 1981 415 p refs Partly in ENGLISH and FRENCH Meeting held in Roros, Norway, 22-25 Jun. 1981
(AGARD-CP-303; ISBN-92-835-0302-3) Avail: NTIS HC A18/MF A01

Distributed processing and its application to avionic systems are discussed. For individual titles, see N82-17087 through N82-17120.

N82-17087# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED DATA PROCESSING: WHAT IS IT? c60
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs (For primary document see N82-17086 08-01)
(Contract N00014-79-C-0873)
Avail: NTIS HC A18/MF A01

Distributed processing is presented as the means to obtain improvements in a number of areas of system performance. Utilizing a list of these desired improvements as the motivational factors, the key design characteristics of systems that delivers a major proportion of these improvements are presented. J.D.H.

N82-17088# Ferranti Ltd., Bracknell (England). Computer Systems Div.
THE EFFECT OF INCREASINGLY MORE COMPLEX AIRCRAFT AND AVIONICS ON THE METHOD OF SYSTEM DESIGN c06
J. T. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 5 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The evolution of aircraft and their associated avionics is described. The evolutionary progress is considered as starting from a simple low speed aircraft with rudimentary flight instruments and sighting systems, through the interconnection of some of these systems and progressing to recent avionic systems with centralized digital computing. It is shown how the changes in aircraft systems, from the simple analog connection of a few systems, through the analog sensor/interface box/centralized digital system, to the sensor producing digital outputs/interface box/centralized digital system, have produced comparatively small changes in the methodology used for the design of these systems. The move to systems containing distributed processing interconnected by digital highways is shown to be revolutionary rather than evolutionary and to require a new approach to the system design problem so as to reap the maximum advantage from the available computing capability.
Author

N82-17089# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.

A TUTORIAL ON DISTRIBUTED PROCESSING IN AIRCRAFT/AVIONICS APPLICATIONS **c06**

Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

An overview of the state of the art in real time distributed processing as applied to aircraft/avionics is presented. Definitions and concepts are presented starting with the total aircraft as a real time distributed computer-controlled system. The relationship of aircraft mission and avionic system architectures is discussed. Overall system architectural considerations are identified and their impact upon a real time distributed computer-controlled system is detailed. A top-down hierarchical, architectural structure is presented. This top-down structuring is described in terms of the logical functional decomposition of the system as follows: total aircraft/avionic system partitioning of aircraft/avionic subsystems, interconnect bus structure (network), system-wide processing architecture, subsystems definition, and computer systems. Author

N82-17090# Rensselaer Polytechnic Inst., Troy, N. Y. Electrical, Computer, and Systems Engineering Dept.

PERFORMANCE STUDY OF A DISTRIBUTED MICROPROCESSOR ARCHITECTURE FOR USE ABOARD MILITARY AIRCRAFT **c06**

Kang G. Shin and C. M. Krishna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 13 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

An analysis of the performance of the Distributed Microprocessor Airborne Computing System (DMACS) developed at Rensselaer Polytechnic Institute is presented. The DMACS consists of a number of quasi-independent computer subsystems loosely coupled in a highly decentralized structure that yet exhibits high cogency as a system. Some important parameters in the system such as job scheduling and starting delays, bus access delay, and system reliability are studied. In order to highlight the implications of the design options chosen, the structure of the DMACS and that of the Draper Laboratory's Fault-Tolerant Multiprocessor (FTMP) system are compared and the impact of structure on performance is discussed qualitatively. Author

N82-17091# British Aerospace Aircraft Group, Brough (England).

THE DEVELOPMENT OF ASYNCHRONOUS MULTIPROCESSOR CONCEPTS FOR FLIGHT CONTROL SYSTEM APPLICATIONS **c08**

S. M. Wright and J. G. Brown *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs Sponsored in part by RAE (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The use of multiple microprocessors, each functionally dedicated and running asynchronously with a short program cycle time, is described. This approach promises benefits in a number of areas; ease of generating/proving high integrity software, reduced propagation delays, reduced hardware/software synchronization overheads, retention of classical feedback control design techniques, and extendable processing power. A flight dynamics research program using a RAE Hunter aircraft converted to fly-by-wire is discussed. This program has identified a need for a flexible digital flight control processor for such research and has provided a focus and stimulus for multiprocessor studies. The development of digital full authority flight control computer for this specific application, with a view to installation in the aircraft, is discussed. J.D.H.

N82-17092# Elektronik-System G.m.b.H., Munich (West Germany).

FUNCTIONAL VERSUS COMMUNICATION STRUCTURES IN MODERN AVIONIC SYSTEMS **c06**

K. Brammer and A. Weimann *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF 01

The implications of the increase in functional and communication interfaces on avionic system structures are analyzed. Especially the passage from functional design to implemented communication structure of the airborne electronic system is scrutinized. The distributed organization of an avionic system, the realization of which is greatly simplified by bus type intrasystem signal transmission, is compared to the conventional hierarchical system organization. Advantages and drawbacks of both organizations are reviewed especially with respect to interface efficiency, cabling requirements, and the typical topology of avionic systems. J.D.H.

N82-17093# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.

CONTINUOUS RECONFIGURATION IN A MULTIMICROPROCESSOR FLIGHT CONTROL SYSTEM **c08**

Scott L. Maher and Stanley J. Larimer *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

A microprocessor based flight control system design is presented. This system is characterized by a collection of cooperatively autonomous distributed microcomputers interconnected by an arbitrary number of common serial multiplex busses. Each processor in the system independently determines its assignments using a simple algorithm that dynamically redistributes system functions from processor to processor in a never-ending process of reconfiguration. This approach offers several potential benefits in terms of system reliability, and the architecture in general incorporates many state of the art features which promise improved system throughput, expandability, and above all, ease of programming. The Continuously Reconfiguring Multi-Microprocessor Flight Control System (CRM2FCS) represents a significant data point in multiprocessor control system research. Promising ideas from a variety of references have been included and integrated in its design. J.D.H.

N82-17094# FGAN, Wachtberg-Werthhoven (West Germany).

EXPERIENCES WITH THE EXPERIMENTAL FFM-MCS **c60**

Hermann von Issendorff *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The FFM-Multicomputer System (FFM-MCS), built up to investigate the utilization of microprocessor based computing networks for the various requirements of embedded data processing and control in military systems is described. Being designed as an adaptable building block system the FFM-MCS serves as a testbed for research on distributed data processing. A general method for the design of process networks followed by the adaption of adequate hardware networks is discussed. Several types of messages are introduced for efficient and safe communication between autonomous process modules. Some improvements of the hardware building block system are presented. J.D.H.

N82-17095# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.

SAVANT: A DATABASE MANIPULATION TECHNIQUE FOR SYSTEM ARCHITECTURE DESIGN VERIFICATION AND ANALYSIS **c60**

A. A. Callaway *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The SAVANT (System Architecture Verification and Analysis Technique), a computer program developed to provide a tool for automatic system design verification and analysis is described. Its application is oriented towards loosely-coupled bus connected systems but is not exclusively confined to these. Flexibility has been built into the program to characterize aspects of the system architecture. The SAVANT program provides the facilities for interactively initiating, extending, modifying, filing, and retrieving the data base, which represents various facets of the system under investigation, and for configuring a system from the data base information. The system thus configured can be analyzed in a number of ways and the analyses performed suggest how the basic information should be modified in order to correct errors and inconsistencies or to improve efficiency. A consistent system can be further modified and tuned, although SAVANT still checks the validity of all operations performed. Finally, the

user is able to 'firm up' the system when it has reached a satisfactory state, producing design requirements and a system description in a form which can input as a schedule to a bus control processor. Author

N82-17096# Research Triangle Inst., Research Triangle Park, N. C.

SIGNAL PROCESSING WITH SYSTOLIC ARRAYS **c32**

R. W. Priester, K. Bromley, H. J. Whitehouse, and J. B. Clary *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)

(Contract N66001-80-C-0118)

Avail: NTIS HC A18/MF A01

Systolic arrays are formed by providing nearest-neighbor interconnections between a large number of elemental processors to form either a one or two dimensional array. With the possible exception of boundary elements, each processing element performs identical computations in synchronism with other elements in the array. Important problems for which systolic arrays hold potential are mentioned and the systolic array processor definition, in a number of its forms, are reviewed. When applied to strongly band-limited matrices, systolic array processors can be characterized as highly efficient from the standpoint of both hardware utilization and algorithm time. However, as the bandwidth becomes large, this high performance is degraded. A data transformation which, when applied to an n x n dense matrix, results in an improved banded structure with attendant hardware savings is introduced and evaluated. Some efficient testability features of these processors which can be exploited concurrently are summarized. B.W.

N82-17097# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.

ECONOMIC CONSIDERATIONS FOR REAL-TIME NAVAL AIRCRAFT/AVIONICS DISTRIBUTED COMPUTER CONTROL SYSTEMS **c06**

Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

Economic considerations for Distributed Computer Control Systems (DCCS) are discussed. Centralized, distributed and federated processing architectures are used as the primary set of systems alternatives from which economic factors are developed. The economic impact of subsequent logistic support for standardized computer hardware and software versus non-standard products is identified. System considerations such as reliability, maintainability, availability, built-in-test, fault tolerance, and redundancy are examined from the standpoint of resources available to design and develop the DCCS, and also from the viewpoint of economic impact of failure of the DCCS to perform as expected. The economic impact of external factors such as the rate of technology advancement, technology independence, limited production runs, and the general lack of economic leverage upon the market are examined and related to the life-cycle support requirements of the DCCS. Author

N82-17098# Ferranti Ltd., Bracknell (England). Computer System Div.

FUNCTIONAL DOCUMENTATION. A PRACTICAL AID TO THE ORDERLY SOLUTION OF THE SYSTEM DESIGN PROBLEM **c60**

J. J. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

A method of breaking down a Customer Requirement in an orderly manner so as to produce progressively more detailed design levels such that at any one stage of the System Design the particular part of the design under consideration can firstly be easily understood and secondly comparatively isolated from the other parts of the design is described. The most important characteristic of the design methodology is that the Requirement is considered in purely Functional terms until a highly detailed level of the design is reached. An example of this design methodology and the technique of Functional Documentation is given and the advantages that can accrue from a sensible use of the design methodology are discussed. Author

N82-17099# British Aircraft Corp., Preston (England). Aircraft Group.

A CONSISTENT APPROACH TO THE DEVELOPMENT OF SYSTEM REQUIREMENTS AND SOFTWARE DESIGN **c61**

A. O. Ward *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

Some of the problems encountered in the development of system and software requirements are discussed and generalized solutions suggested. A specific approach is described, the SAFRA Project, including extensions into the area of software design. This approach embraces the use of a methodology, Controlled Requirements Expression (CORE) interfaced with a computer based System Description Language for storage and automatic analysis. Software design assumes the use of a MASCOT rationalized executive and CORAL as the implementation language. Experimental procedures for the automatic extraction of CORAL programmes from detailed requirements held on a data base are discussed. Author

N82-17100# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

A PEARL SOFTWARE SYSTEM FOR MULTI-PROCESSOR SYSTEMS **c61**

P. Elzer and H.-J. Schneider *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

A High-Order-Language-System based on PEARL to program Multi-Processor-Systems in an airborne or similar environment was developed. It was necessary to minimize the overhead produced by the operating system. The generated code was optimized to a very high efficiency with respect to time and memory. Originally the aim of PEARL was process-control. Due to the application area here, subsetting of PEARL was possible. This was done with high efficiency of code and a smaller modular operating system in mind. On the other hand extensions to allow distributed processing were implemented. It exists on a host-computer and is written in FORTRAN for portability. The system was successfully used in several applications. Author

N82-17101# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

DISTRIBUTED AND DECENTRALIZED CONTROL IN FULLY DISTRIBUTED PROCESSING SYSTEMS **c60**

Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 p 16 refs (For primary document see N82-17086 08-01)

(Contract F30602-78-C-0120)

Avail: NTIS HC A18/MF A01

A number of the characteristics of a distributed and decentralized control system and some of its operational features are identified and discussed. Extremely loose coupling, both physical and logical, is an essential characteristic of an FDPS. This mode of organization and operation is quite different from the control of centralized systems. Various models of control that may provide these features and the operational characteristics of those models are described. B.W.

N82-17102# INRIA, Rocquencourt (France).

RECOVERY IN DISTRIBUTED PROCESSING SYSTEMS **c62**

Liba Svobodova *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

A powerful control abstraction called an atomic action was developed as a general mechanism for controlling access to shared distributed data. In order to preserve consistency of the system, if an atomic action fails, all of its effects are undone; thus if a long complex computation is reprsented as an atomic action, an important amount of possibly useful work might be lost. The proposed scheme which facilitates selective internal recovery from detected errors, mode failures, and communication failures

employes nested atomic action. When an atomic action terminates, its results are not made permanent until the outermost atomic action is committed, but they survive local model failures. Each subtree of nested atomic actions is recoverable (undoable) individually, thus making it possible to switch to an alternative algorithm, service, or physical mode upon a failure. Finally, a recovery point is established in stable storage as part of a remote request, so that work done outside of the requesting node is not lost if this node fails. Author

N82-17103# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.

GENERALIZED POLLING ALGORITHMS FOR DISTRIBUTED SYSTEMS c62

Jack Keil Wolf *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)

(Grant NSF ESC-79-21140)

Avail: NTIS HC A18/MF A01

A polling algorithm for a distributed system is an algorithm which can be simultaneously run at all terminals in a network and which has as its aim the determination of which terminals have a positive response to a specific query. Of particular interest is the situation where one expects very few of the terminals to respond positively and where a terminal signifies a negative response by not transmitting at all. In such a case it is inefficient to poll the terminals in a round robin manner. A more efficient procedure is to group the terminals into subsets in which all terminals in a subset are queried simultaneously. Then if all respond negatively no further queries need be addressed to that subset. If the responses from the terminals in the subset are mixed than this subset is further subdivided into smaller subsets until the responses of all the terminals are determined. Two distinct algorithms for polling are considered. In both algorithms, the terminals of the network are represented by leaves in a binary tree and the subsets are subtrees in the overall tree. The two systems differ in the assumptions made regarding the types of responses sent and how the responses are interpreted. The performance of these two schemes are compared with each other and with ordinary round robin polling. Author

N82-17104# Boeing Military Airplane Development, Seattle, Wash. Digital Flight Controls Research Dept.

STAGE-STATE RELIABILITY ANALYSIS TECHNIQUE c38

Alan D. Stern *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

An advanced flight control system reliability analysis technique must properly account for the defined success criteria, redundancy level, redundancy management, technique, system dependencies, and failure detection coverage. The stage state reliability analysis technique properly accounts for these factors. It is also computationally simple such that triplex redundant systems have been analyzed using an early 1970's desktop computer. This method is well suited for analysis by the system architect. The process begins with a system block diagram showing all element connections. A success logic diagram is then written reflecting all possible success states. The probability of success equation is written directly from the logic diagram and evaluated by substituting the probability expression for each system element. Multiple success criteria can be applied to one problem formulation simply by deleting those states which do not satisfy the success criterion. Author

N82-17105*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

METHODOLOGY FOR MEASUREMENT OF FAULT LATENCY IN A DIGITAL AVIONIC MINIPROCESSOR c06

John C. McGough, Fred Swern, and Salvatore J. Bavuso *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p refs Prepared in cooperation with Bendix Corp., Teterboro, N.J. (For primary document see N82-17086 08-01)

(Contract NAS1-15946)

Avail: NTIS HC A18/MF A01 CSCL 01D

Using a gate level emulation of a typical avionics miniprocessor, fault injection experiments were performed to (1) determine the time to detect a fault by comparison monitoring, (2) forecast a program's ability to detect faults and (3) validate the fault detection coverage of a typical self test program. To estimate time to detect, six programs ranging in complexity from 6 to 147 instructions, were emulated. Each program was executed repetitively in the presence of a single stuck at fault at a gate node or device pin. Detection was assumed to occur whenever the computed outputs differed from the corresponding outputs of the same program executed in a nonfaulted processor. Histograms of faults detected versus number of repetitions to detection were tabulated. Using a simple model of fault detection, which was based in an analog with the selection of balls in an urn, distributions of time to detect were computed and compared with those obtained empirically. A self test program of 2,000 executable instructions was designed expressly for the study. The only requirement imposed on the design was that it should achieve 95% coverage. The program was executed in the presence of a single stuck-at fault at a gate node on device pin. The proportion of detected faults are tabulated. In all experiments faults were selected at random over gate nodes or device pins. Author

N82-17106*# SRI International Corp., Menlo Park, Calif. Computer Science Lab.

HIERARCHICAL SPECIFICATION OF THE SIFT FAULT TOLERANT FLIGHT CONTROL SYSTEM c08

P. M. Melliar-Smith and Richard L. Schwartz *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 15 p refs (For primary document see N82-17086 08-01)

(Contract NAS1-15428)

Avail: NTIS HC A18/MF A01 CSCL 01B

The specification and mechanical verification of the Software Implemented Fault Tolerance (SIFT) flight control system is described. The methodology employed in the verification effort is discussed, and a description of the hierarchical models of the SIFT system is given. To meet the objective of NASA for the reliability of safety critical flight control systems, the SIFT computer must achieve a reliability well beyond the levels at which reliability can be actually measured. The methodology employed to demonstrate rigorously that the SIFT computer meets as reliability requirements is described. The hierarchy of design specifications from very abstract descriptions of system function down to the actual implementation is explained. The most abstract design specifications can be used to verify that the system functions correctly and with the desired reliability since almost all details of the realization were abstracted out. A succession of lower level models refine these specifications to the level of the actual implementation, and can be used to demonstrate that the implementation has the properties claimed of the abstract design specifications. Author

N82-17107# Litton Technische Werke, Freiburg (West Germany).

RECONFIGURATION: A METHOD TO IMPROVE SYSTEMS REALIABILITY c60

J. Szlachta *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

A system with hardware and software reconfiguration capabilities was developed to improve the reliability of a flight-augmentation computer. The system consists of a network of n redundant computers, linked via m serial buses. A two computer processing units and two or more input/output drivers. A fault in one of the components of the redundant computers causes a hardware reconfiguration which replaces the faulty component by its still functioning twin. If a redundant computer fails altogether, all tasks allocated to it are transferred to one of the still working computers of the network. This is made possible by loading dormant copies of the tasks into at least one other computer of the initial system. These dormant copies are periodically supplied with the program status of the active copy. Author

N82-17108# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).

A RECONFIGURABLE CHANGE NETWORK FOR DISTRIBUTED PROCESS CONTROL [RESEAU D'ECHANGE RECONFIGURABLE POUR CONTROLE DE PROCESSUS REPARTI] c60

Ch. Meraud and B. Maurel (Societe. Anonyme de Telecommunications) *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A highly reliable, high output system of change is described which permits decentralized exchange between the diverse equipment onboard an aircraft or other type of vehicle in order to integrate and reconfigure the functions, no matter how critical. Very large scale integration and fiber optics which are insensitive to electromagnetic perturbations made possible a performing decentralized solution by incorporating intelligence in a universal type linking module called the subsystem interface. For the traditionally programmed mechanism for generating change, a dynamic mechanism immediately adapted to modification, is substituted which permits a great degree of synchronization.
Transl. by A.R.H.

N82-17109# Norwegian Defence Research Establishment, Kjeller.
PROTOCOL LEVEL MODULES FOR COST EFFECTIVE STANDARD COMPUTER COMMUNICATION c60
Oyvind Hvinden, Yngvar Lundh, and Oystein Sandholt *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

A set of microcomputer modules for implementation of network front-end, gateway and specilized host computers are being developed. A highly modular design approach is taken. One or more of these protocol modules may be interconnected to constitute the units referred to. A 'library' of tested hardware sub modules is established, new modules may quickly be developed using these sub modules. A framework for unified protocol implementation and protocol interconnection is defined. This includes a real time operating system kernel with functions for buffer management, timing, pseudo parallel process execution and process communication. Author

N82-17110# Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.
RETRANSMISSION STRATEGIES FOR ERROR CONTROL IN PACKET TRANSMISSION PROTOCOLS [LES STRATEGIES DE RETRANSMISSION POUR LE CONTROLE D'ERREUR DANS LES PROTOCOLES DE TRANSFERT DE DONNEES] c32
Guy Juanole *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

Packet transmission is based on a hierarchial model in which each of several levels uses the services of a lower level. This approach, which is essential for good visualization of the different functions necessary for transmission, also allows for the distinction of two levels in error control. A higher level is related to control on packet arrial (implemented by mechanisms of numbered packets, of responses to numbered packets, and to retransmission of nondischarged numbered packets). The lower level is related to the contents of numbered packets to responses (implemented by error detecting codes). These two levels clearly and precisely define different retransmission strategies. Two classes of strategies are defined: when the retransmission is due uniquely to a temporization which is implemented in the higher level, or when the retransmission is equally implemented following errors detected by the inferior level. In each class, different strategies are defined which result from different possible modalities.
Transl. by A.R.H.

N82-17111# British Aerospace Aircraft Group, Brough (England). Avionics Systems Div.
PRACTICAL ASPECTS WHICH APPLY TO MIL-STD-1553B DATA NETWORKS c06
I. Moir (Smiths Industries Aerospace and Defense Systems Co., Cheltenham, England) and P. A. Duke *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The data bus offers many potential advantages over hardwired or dedicated data transmission systems in the design of Avionic Systems. Systems are interconnected by a single or redundant twisted pair of wires via standard interfaces, so reducing intersystem wiring and the types and numbers of interfaces. The quantity of data transferred no longer has a direct influence on the inter system wiring and distributed computing becomes feasible. However in spite of the obvious advantages of a data bus system there are certain limitations which could be the source of much heartache to the system designer. Problems may result from transmission delays, digital sampling noise and the fundamental upper limit on data item-data rate product. Also, since interconnection between systems is via a common path, faults in the communication medium can have serious consequences, and therefore the use of redundancy and error correction techniques need to be employed. A stores management and weapon aiming system is discussed. Author

N82-17112# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
THE TRAFFIC FLOW IN A DISTRIBUTED REAL TIME COMPUTING SYSTEM (RDC-SYSTEM) WITH A FIBER-OPTIC RINGBUS SYSTEM c60
Dirk Heger and Reinhard Baehre *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The new generation of automatic systems is essentially characterized by distributed multi-computer systems. The architecture is based on distributed microcomputer stations linked together by a bus system. These systems give much more design alternatives than conventional single or multicomputer systems, the danger of obtaining bottle necks of system performance is considerably greater than it was by using functional modules operating independently and simultaneously. Therefore, mathematical modeling of bus-linked multicomputer systems and the experimental evaluation of these models is online operation by means of measurements is of increasing importance. The 'really distributed control computer' system, and the traffic flow on its fiber optic ringbus system are described. Author

N82-17113# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
DISPERSED SENSOR PROCESSING MESH PROJECT c32
Vincent A. Megna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

The F-8 dispersed sensor processing mesh project is an exploratory program involved in the development and test of the concept of a network communication structure. The elements of the structure are a bus controller and a number of nodes all of which are interconnected by multiple data flow paths. This structure is proposed as the communication medium between the subsystems of a distributed avionic system. In order to test and establish a data base for this proposed communication structure, the elements that comprise it must be designed and built. These elements are not just the hardware that is inherent to the structure, they also include the algorithms mechanized in the bus controller's software, the operating characteristic of the network, and the communication protocol used. The design and associated decisions made during the development of the network hardware and software are considered. A.R.H.

N82-17114# Hughes Aircraft Co., Fullerton, Calif.
NEXT GENERATION MILITARY AIRCRAFT WILL REQUIRE HIERARCHICAL/MULTILEVEL INFORMATION TRANSFER SYSTEMS c06
James W. McCuen *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

Changes in avionic subsystems and mission roles of next generation aircraft require new concepts in data transfer. New aircraft need total airframe/weapon system integration which means new approaches must be developed for the interconnection of avionic subsystems. Effort has begun to develop a Military Standard (MIL-STD) which will define the requirements for a high speed data bus network. The standard shall characterize a

higher order information transfer system (ITS) that will interconnect avionic systems, that contain their own multiplex ITS, into a fully integrated data complex. The higher order ITS shall employ an operational protocol that will provide subsystems and common sensors, independence and fault isolation by distributed control of the common data bus. Author

N82-17115# Bendix Corp., Teterboro, N. J. Flight Systems Div.

SIFT: AN ULTRA-RELIABLE AVIONIC COMPUTING SYSTEM **c06**

Kurt Moses *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

Software implemented fault tolerance (SIFT) is an ultra-reliable computing system which is based on a multiprocessor architecture that achieves fault tolerance by replicating computing tasks among processing units. Error detection and system configuration are performed by software to maintain the operational integrity of the computing system. The high speed inter-computer communication system required for operation realized by dedicated serial links arrayed in a star connection. Software algorithms are used for failure detection by means of voting, failure isolation to the faulty processor, and reconfiguration after fault detection. Frame synchronization between processors is employed to reduce data skew and minimize false alarms. The architecture of SIFT, its hardware implementation, and the test stand used for evaluation. Potential applications of this technique to current and anticipated ultra-reliable electrical flight control systems are given. A.R.H.

N82-17116# Naval Weapons Center, China Lake, Calif. Facility Engineering Branch.

STATE-OF-THE-ART COMPUTER MONITORING EQUIPMENT **c60**

Harvey G. Nelson *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

In any tactical airborne computing system, it is crucial for developers and maintenance personnel to know in considerable detail what is happening inside the computer on a real-time basis. This is especially true for a distributed system. A hardware monitor, called SOVAC (software validation and control), that provides a high-capacity, real-time, user-selective 'window' that gives visibility into the internal workings of the tactical computer is described. Author

N82-17117# Royal Aircraft Establishment, Farnborough (England).

INTEGRATED CONTROL OF MECHANICAL SYSTEM FOR FUTURE COMBAT AIRCRAFT **c06**

G. W. Wilcock, P. A. Lancaster, and C. Moxey *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs Prepared in cooperation with British Aerospace, Warton Sponsored in part by Procurement Executive MOD (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

Various techniques for the application of digital control to aircraft utility systems were investigated. It is shown that the prefered approach utilizes a number of distributed processors and terminals that interface with the utility components. Analysis performed to data shows a weight saving of approximately 100 Kg (i.e., 50%), and a pilot workload reduction of the order of 4:1, may be achieved in a twin engine combat aircraft.A.R.H.

N82-17118# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).

MIRAGE 2000 WEAPONS SYSTEMS ARCHITECTURE [ARCHITECTURE DU SYSTEME D'ARMES DU MIRAGE 2000] **c05**

S. Croce-Spinelli, B. Vandecasteele, and J. F. Ferreri *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p In FRENCH (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The architecture for the Mirage 2000 weapon system, which represents an advanced generation digital system, is described from the following viewpoints: (1) the digital equipment; (2) the distribution of among the equipment; (3) the digital links; and (4) the inflight monitoring of the system. The principal on which the design is based, the methods of development, and the tests required are analyzed. The inherent flexibility of the system permits its adaptation to different operational requirements, and to different possible versions. Transl. by A.R.H.

N82-17119# McDonnell Aircraft Co., St. Louis, Mo.

F/A-18A TACTICAL AIRBORNE COMPUTATIONAL SUB-SYSTEM **c06**

T. V. McTigue *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The F/A-18A Hornet tactical computer subsystem consists of two central mission computers and a number of distributed processors embedded in various sensor and display subsystems. This distributed processing system is interconnected by and communicates over a MIL-STD-1553A serial 1 MHz command/response multiplex network. The distributed processing system architecture is discussed and the rationale is presented for the partitioning of the computational tasks between the central mission computers and the distributed processors embedded in the sensor subsystems. The salient features of the central mission computer and the distributed processors are discussed along with a description of the functional operation of the interconnecting MIL-STD-1553A multiplex communications system. The development process for the Operational Flight Program (OFP) for the Central mission computers is described and the support facilities which were used for the software integration and validation are discussed. A.R.H.

N82-17120# Naval Weapons Center, China Lake, Calif. F-18 Facility Branch.

F/A-18 WEAPONS SYSTEM SUPPORT FACILITIES **c05**

Thomas F. O'Neill *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p (For primary document see N82-17086 08-01)

Avail: NTIS HC A18/MF A01

The U.S. Navy is currently acceptance-testing the McDonnell Douglas F/A-18 aircraft. Since the F/A-18 is so much more complex than any aircraft current deployed, more sophisticated support tools will be required. The main support tool is to be a weapons system support facility including all of the hardware and software necessary to test, modify, and validate all of the avionics hardware, software, and firmware. A distributed processing approach is used in the facility, which contains several minicomputers and super minicomputers. Author

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

N82-17121*# Hughes Helicopters, Culver City, Calif.

BLADE PLANFORM FOR A QUIET HELICOPTER Final Report

D. S. Janaki Ram Sep. 1980 31 p refs

(NASA Order A-65550B)

(NASA-CR-166256; T-35584) Avail: NTIS HC A03/MF A01 CSCL 01C

The effects of blade planform and tip speed on noise and performance for a Hughes 500 C rotor system were studied. A cursory examination of the effects of such planform shapes as regular, inverse, and no taper on the noise and performance of the rotor was conducted. It was found that a constant width wide chord planform at tower tip speed provided the best performance and lowest noise. The tapered planforms had lower performance figures due to the reduced solidity. However, some noise reductions were achieved. R.J.F.

N82-17122*# McDonnell-Douglas Corp., St. Louis, Mo.

TESTS OF A D VENTED THRUST DEFLECTING NOZZLE

BEHIND A SIMULATED TURBOFAN ENGINE Final Report
T. L. Watson Washington NASA Jan. 1982 139 p refs
(Contract NAS3-21733)
(NASA-CR-3508; MDC-A6930) Avail: NTIS HC A07/MF A01 CSCL 01A

A D vented thrust deflecting nozzle applicable to subsonic V/STOL aircraft was tested behind a simulated turbofan engine in the verticle thrust stand. Nozzle thrust, fan operating characteristics, nozzle entrance conditions, and static pressures were measured. Nozzle performance was measured for variations in exit area and thrust deflection angle. Six core nozzle configurations, the effect of core exit axial location, mismatched core and fan stream nozzle pressure ratios, and yaw vane presence were evaluated. Core nozzle configuration affected performance at normal and engine out operating conditions. Highest vectored nozzle performance resulted for a given exit area when core and fan stream pressure were equal. Its is concluded that high nozzle performance can be maintained at both normal and engine out conditions through control of the nozzle entrance Mach number with a variable exit area. E.A.K.

N82-17123# National Aerospace Lab., Tokyo (Japan).
A NEW METHOD OF ESTIMATING THE LATERAL WALL EFFECT ON THE AIRFOIL INCIDENCE DUE TO THE SUCTION AT SIDE WALLS
Hideo Sawada, Seizo Sakakibara, Mamoru Sato, Hiroshi Kanda, and Toshio Karasawa Aug. 1981 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-680; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The velocity component is approximated from the pressure difference across the plates by the aid of an experimental equation which states that the normal velocity component to a porous plate induced by the pressure difference across the plate is proportional to the square root of the pressure difference. In this method, the proportional constant number need not be known. An experiment was carried out in which the pressure in a suction box, one side of which consisted of a porous plate, was set at various values in this experiment. The lift coefficient of an airfoil model changed with the variation of the pressure in the suction box even at the same uniform flow speed and the same incidence. The unique value of the lift coefficient was determined from several such lift coefficients at the same incidence. The corrected lift coefficient curve obtained is very close to one obtained in a test section with fully solid side walls. T.M.

N82-17124# National Aerospace Lab., Tokyo (Japan). STOL Aircraft Project Group.
SURVEYS OF FLOW-FIELD AROUND EMPENNAGE OF THE NAL STOL-RESEARCH-AIRCRAFT MODEL
Jul. 1981 80 p refs In JAPANESE; ENGLISH summary
(NAL-TR-677; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

The flow field around the empennage for the STOL landing were measured. The down wash angle, the side wash angle, and the dynamic pressure at the aerodynamic center of the empennage were obtained by linear interpolation at the two sections perpendicular to the free steam. Effects of the engine thrust coefficient and the two types of vortex generator on the flow field, and the directional stability in the case of an inner engine becoming inoperative, were studied. E.A.K.

N82-17125# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering.
EXPERIMENTAL STUDY OF DELTA WING LEADING-EDGE DEVICES FOR DRAG REDUCTION AT HIGH LIFT M.S. Thesis
Thomas Dwight Johnson, Jr. Dec. 1980 139 p refs
Avail: NTIS HC A07/MF A01

Future fighter aircraft requirements specify efficient supersonic cruise and high-g maneuverability at high lift. The slender delta wing meets the first requirement but has large lift induced drag increments at high lift. One method to alleviate the drag is to control the flow at the wind leading edge (LE) by means of small LE devices, so as to maintain locally attached flow to higher angles of attack and thus increase the level of aerodynamic thrust. The devices selected for evaluation were the fence, slot, pylon-type vortex generator (VG), and sharp leading-edge extension (SLEE). These devices were tested on a 60 deg flatplate delta (with blunt LE) in the Langley Research Center (NASA) 7- by 10-foot high-speed tunnel at low-speed and to angles of attack of 28 degrees. Balance and static pressure measurements were taken. The results indicate that all the devices have significant drag reduction capability and improved longitudinal stability while a slight loss of lift and increased cruise drag occurred. T.M.

N82-17126*# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
EXPERIMENTAL TRIM DRAG VALUES FOR CONVENTIONAL AND SUPERCRITICAL WINGS M.S. Thesis
Peter Fredric Jacobs Dec. 1981 165 p refs Sponsored by NASA
(NASA-CR-168500) Avail: NTIS HC A08/MF A01 CSCL 01A

Supercritical wings were studied to determine whether they incur higher trim drag values at cruise conditions than wide body technology wings. Relative trim drag increments were measured in an experimental wind tunnel investigation. The tests utilized high aspect ratio supercritical wing and a wide body wing in conjunction with five different horizontal tail configurations, mounted on a representative wide body fuselage. The three low tail configurations and two T tail configurations were chosen to measure the effects on horizontal tail size, location, and camber on the trim drag increments for the two wings. The increase in performance (lift to drag ratio) for supercritical wing over the wide body wing was 11 percent for both the optimum low tail and T tail configurations. S.L.

N82-17127# Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
ROLL UP MODEL FOR ROTOR WAKE VORTICES, PART 5
Maarten Landahl Stockholm Aeronautical Research Inst. of Sweden 13 Nov. 1981 28 p refs
(Contract NE-5061-014)
(ASRL-TR-194-4; FFA-HU-2262-Pt-5) Avail: NTIS HC A03/MF a01

Conservation of momentum and energy is used to estimate the core size of a rolled-up vortex from a propeller or rotor blade tip. A simplified planar model due to Prandtl is employed to determine the strength, position, and vore size of the rolled-up vortices. This model is valid when the number of blades is large such that the distance between the wake vortex sheets is much less than the diameter of the rolled-up vortex spirals. The vortex is assumed to have a core of constant vorticity (Rankine vortex). Three dimensionality is then accounted for by modeling the actual spiral wake vortex as a row of regularly spaced vortex rings. The core diameter is found to be about 40 percent of this distance, with a slight decrease with increase in spacing-to-diameter ratio. The core velocity is found to increase with increased spacing from 0.5 of the wake velocity at zero spacing to about 0.7 of the wake velocity at a spacing of three times the wake radius. Author

N82-17128# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
THEORY AND EXPERIMENT IN UNSTEADY AERODYNAMICS
H. Bergh, H. Tijdemann, and R. J. Zwaan 11 Dec. 1980 26 p refs Presented at Aeroelastic Colloq., Goettingen, West Germany, 24 Sep. 1980
(NLR-MP-80046-U) Avail: NTIS HC A03/MF A01

A historical review is given of the role of theory and experiment in investigations of unsteady aerodynamics. Author

N82-17129# National Aerospace Lab., Amsterdam (Netherlands). Dept. of Aeroelasticity.
A WIND TUNNEL STUDY OF THE FLUTTER CHARACTERISTICS OF A SUPERCRITICAL WING
R. Houwink, A. N. Kraan, and R. J. Zwaan 28 Jan. 1981 10 p refs Presented at 22nd SDM/Dyn. Specialists Conf., Atlanta, 6-10 Apr. 1981 Sponsored by Netherlands Agency for Aerospace Programs Prepared in cooperation with Royal Netherlands Aircraft Factories Fokker, Amsterdam
(NLR-MP-81002-U) Avail: NTIS HC A02/MF a01

A wind-tunnel flutter test on a supercritical wing model is described. Objectives of the test were to investigate the transonic

dip and to enable comparison with calculated flutter characteristics in which a quasi-three dimensional transonic theory was used. The beginning of a transonic dip was measured and a satisfactory agreement with theory could be found. An additional flutter instability in the bottom of the transonic dip could be correlated with the loose of transition strip effectivity at low Reynolds numbers. Author

N82-17130# Ohio State Univ., Columbus. Dept. of Electrical Engineering.
ANALYSIS OF THE CURVED JUNCTION EDGE BETWEEN A FLAT PLATE AND A PROLATE SPHEROID
H. Chung, W. D. Burnside, and N. Wang May 1981 12 p refs
(Contract N00019-80-C-0593)
(AD-A106543; ESL-713321-1) Avail: NTIS HC A02/MF A01 CSCL 01/2

The process of attaching the flat plate to the prolate spheroid (aircraft fuselage) and finding the curved junction edge was studied. The approach to this problem is first to find the intersection point between a line (i.e., one edge of the plate) and the prolate spheroid. The same idea is used to find the curved junction edge between a flat plate and the prolate spheroid. GRA

N82-17131# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
DEVELOPMENT OF A COMPUTER BASED PRESENTATION OF NON-STEADY HELICOPTER ROTOR FLOWS Interim Report, 1 Jul. 1979 - 30 Apr. 1981
Henry R. Velkoff and Richard R. Navarro Sep. 1981 121 p refs
(Contract DAAG29-79-C-0074)
(AD-A108107; ARO-14142.6-EX; OSURF-761646/711999) Avail: NTIS HC A06/MF A01 CSCL 01/3

A system to measure the non-steady velocities in the model rotor wake was modified to provide velocity data in a form more useful to the user of the data. Hot wire angle parameters were modified so as to provide better correlations by using cosine law in place of the usual K-squared technique common in hot-wire anemometry. The results of the non-steady measurements were presented in the form of motion pictures of the non-steady computer generated vector plots. Author (GRA)

N82-17132# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
ROTOR FLOW RESEARCH IN LOW SPEED HELICOPTER FLIGHT Final Report, 1 Jul. 1979 - 30 Apr. 1981
Henry R. Velkoff Sep. 1981 24 p refs
(Contract DAAG29-79-C-0074)
(AD-A107873; ARO-14142.7-EX) Avail: NTIS HC A02/MF A01 CSCL 20/4

Measurements of helicopter rotor wake flow were made at low advance ratio. Both steady and non-steady data were taken in the wake using 3-D hot-film anemometry. Emphasis was placed on the presentation of the data. Motion pictures were obtained from the computer plots of the experimental velocity data.
Author (GRA)

N82-17133# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
NON-STEADY VELOCITY MEASUREMENT OF THE WAKE OF A HELICOPTER ROTOR AT LOW ADVANCE RATIOS Interim Report, 1 Jul. 1979 - 30 Apr. 1981
H. R. Velkoff and H. Terkel Sep. 1981 127 p refs
(Contract DAAG29-79-C-0074)
(AD-A107722; ARO-14142.5-EX; OSURF-761646/711999) Avail: NTIS HC A07/MF A01 CSCL 20/4

A system was developed which could measure the instantaneous velocities in the wake of a model helicopter rotor operating at low advance ratios. A three-wire hot film probe was mounted on a traverse and placed at many positions in the wake. The output of the probe was fed into an on-line computer operating in an interactive mode. Computer generated vector plots were made of both time averaged velocities and instantaneous velocities for the case of mu = 0.06.
Author (GRA)

N82-17134# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
EXPERIMENTAL VERIFICATION OF AN AERODYNAMIC PARAMETER OPTIMIZATION PROGRAM FOR WIND TUNNEL TESTING Final Report, Oct. 1980 - Sep. 1981
Richard L. Palko and Margaret Anne Crawford AEDC Nov. 1981 32 p refs
(AD-A107727; AEDC-TR-81-23) Avail: NTIS HC A03/MF A01 CSCL 20/4

The optimization algorithm developed for the SOFT wing program has been revised to make it more applicable for use in routine wind tunnel testing. The algorithm modification removed some unused routines and simplified the control input requirements. The modified optimization algorithm was demonstrated in the 1-ft transonic Aerodynamic Wind Tunnel (1T) using a 3-degree-of-freedom model. The test Mach number was 0.8. The algorithm was successfully demonstrated for all three optimization runs attempted. These included minimization of drag coefficient for a specified coefficient of lift, maximization of lift coefficient for a specified coefficient of drag, and maximization of lift-to-drag ratio for a specified coefficient of drag.
Author (GRA)

N82-17135# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Aeronautics and Aerospace Dept.
FINITE DIFFERENCE COMPUTATION OF THE CONICAL FLOW FIELD OVER A DELTA WING
L. Vigevano Aug. 1981 55 p refs
(VKI-TN-140) Avail: NTIS HC A04/MF A01

A numerical approach using finite differences applied to a nonlinear governing equation was adopted in order to introduce compressibility effects in a model of the vertical flow past a sharp leading edge on a delta wing. A conical line vortices model was adapted to a through field computation. From numerical experiments, criteria for the representation of a mathematical vortex in a finite difference scheme are derived Comparison of the numercial results with the Brown and Michael analytical solution shows that the first order scheme employed preserves satisfactory accuracy in the prediction of the wing loads.
Author (ESA)

N82-17136# European Space Agency, Paris (France).
INVESTIGATION OF A LAMINAR TWO-COMPONENT BOUNDARY LAYER ALONG AN EVAPORATION LIQUID FILM BY MEANS OF A FINITE DIFFERENCE METHOD
Heinrich Eickhoff, Joerg Schroeppel, and Frank Thiele Nov. 1981 43 p refs Transl. into ENGLISH of "Untersuchung der Laminaren Zweistoffgrenzschicht Laengs eines Verdunstenden Fluessigkeitsfilms mit Hilfe eines Differenzenverfahrens" Rept. DFVLR-FB-80-34 Cologne, Sep. 1980 Original report in GERMAN previously announced as N81-22330
(ESA-TT-711; DFVLR-FB-80-34) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 11,10

A flat liquid film of constant thickness, at rest, unilaterally wetting a plate is described as it evaporates into a stream of hot air. The two component boundary layer flow which is generated by this system as well as the coupled mass and heat transfer at the liquid film surface is calculated by means of an implicit finite difference method of Hermitian type, taking into account temperature and concentration dependent properties. The solutions of the coupled partial differential equations for mass, momentum, and energy are compared with other investigations with respect to accuracy, required iterations and grid points. The results underline the precision and the reliability of the numerical method used. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-17137*# Textron Bell Helicopter, Fort Worth, Tex.
ASSESSMENT OF HISTORICAL AND PROJECTED SEG-

MENTS OF US AND WORLD CIVIL AND MILITARY ROTORCRAFT MARKETS 1960 - 1990 Contractor Report, 2 Aug. 1981
William J. Yates 2 Aug. 1981 203 p
(Contract NAS2-10404)
(NASA-CR-166151) Avail: NTIS HC A10/MF A01 CSCL 05C

The future military and civil worldwide market potential for current and future rotorcraft configurations was assessed. Comparisons by region, mission, civil or military, etc., are made for both historial and forecast data. A comprehensive historical data base was utilized to determine historical and future trends. Consideration was given to socio-political, economic, and technological factors in determining future trends. Author

N82-17138# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
AIRCRAFT ACCIDENT REPORT - UNIVERSAL AIRWAYS, INC., BEECH 65-A80/EXCALIBUR CONVERSION, N100UV, NEAR MADISONVILLE, TEXAS, JULY 2, 1981
17 Dec. 1981 25 p
(NTSB-AAR-81-17) Avail: NTIS HC A02/MF A01

About 1230 Central Daylight Time, on July 2, 1981, a Universal Airways, Inc. Beech 65-A80, N100UV, crashed into an open, level field about 7 nautical miles east southeast of Madisonville, Texas. Witnesses heard a small explosion and saw the aircraft descend from a dark cloud; the wings and the empennage were not attached during the observed portion of the aircraft's descent. The pilot and the two passengers were killed. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cause of the accident was a pilot induced airframe overload following loss of aircraft control which resulted in the structural breakup of the aircraft. The reason(s) for the loss of aircraft control could not be determined. Contributing to the loss of control was the pilot's lack of instrument proficiency in multiengine aircraft. R.J.F.

N82-17139# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
AIRCRAFT ICING AVOIDANCE AND PROTECTION
9 Sep. 1981 16 p
(PB82-108135; NTSB-SR-81-1) Avail: NTIS HC A02/MF A01 CSCL 01C

The problems of aircraft icing from the standpoint of icing statistics, the meteorological factors which cause icing, the certification of aircraft by the FAA for the flight into known icing conditions, and the forecasting of icing conditions are investigated. It is noted that icing accidents are a problem primarily for general aviation aircraft and that in addition to the accidental losses due to icing, there are significant operational losses due to inadequacies in the weather forecasting system. The problems revealed can be alleviated, but in order to do so new technology will have to be developed based upon a better understanding of ice formation and improvements in the quality of icing forecasts. GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-17140*# Ohio Univ., Athens. Avionics Engineering Center.
COMMUTATED AUTOMATIC GAIN CONTROL SYSTEM
Stephen R. Yost [1982] 25 p refs
(Grant NGR-36-009-017)
(NASA-CR-168440; TM-81) Avail: NTIS HC A02/MF A01 CSCL 17G

A commutated automatic gain control (AGC) system was designed and built for a prototype Loran C receiver. The receiver uses a microcomputer to control a memory aided phase-locked loop (MAPLL). The microcomputer also controls the input/output, latitude/longitude conversion, and the recently added AGC system. The circuit designed for the AGC is described, and bench and flight test results are presented. The AGC circuit described actually samples starting at a point 40 microseconds after a zero crossing determined by the software lock pulse ultimately generated by a 30 microsecond delay and add network in the receiver front end envelope detector. S.L.

N82-17141*# Ohio Univ., Athens. Avionics Engineering Center.
A PROTOTYPE INTERFACE UNIT FOR MICROPROCESSOR-BASED LORAN-C RECEIVER
Stanley M. Novacki, III Nov. 1981 11 p refs
(Grant NGR-36-009-017)
(NASA-CR-168441; TM-82) Avail: NTIS HC A02/MF A01 CSCL 17G

An inexpensive data/command entry and display system is documented. This system is designed to operate in place of a separate ASC2 terminal. The software to interface this unit to the 6502 based navigation receiver is also described. S.L.

N82-17142*# Analytical Mechanics Associates, Inc., Hampton, Va.
TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 2: RNAV/MLS TRANSITION PROBLEMS FOR AIRCRAFT Final Report
Samuel Pines Washington, D.C. NASA Jan. 1982 139 p refs
(Contract NAS1-15116)
(NASA-CR-3511; AMA-80-12-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 17G

The problems in navigation and guidance encountered by aircraft in the initial transition period in changing from distance measuring equipment, VORTAC, and barometric instruments to the more precise microwave landing system data type navaids in the terminal area are investigated. The effects of the resulting discontinuities on the estimates of position and velocity for both optimal (Kalman type navigation schemes) and fixed gain (complimentary type) navigation filters, and the effects of the errors in cross track, track angle, and altitude on the guidance equation and control commands during the critical landing phase are discussed. A method is presented to remove the discontinuities from the navigation loop and to reconstruct an RNAV path designed to land the aircraft with minimal turns and altitude changes. B.W.

N82-17143# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
DOT SHOULD TERMINATE FURTHER LORAN-C DEVELOPMENT AND MODERNIZATION AND EXPLOIT THE POTENTIAL OF THE NAVSTAR/GLOBAL POSITIONING SYSTEM
18 Sep. 1981 16 p
(AD-A107768; GAO/MASAD-81-42) Avail: NTIS HC A02/MF A01 CSCL 17/7

The U.S. Coast Guard is planning to modernize its existing LORAN-C navigation system, even though LORAN-C can potentially be replaced by the Department of Defense's NAVSTAR/Global Positioning System (GPS) in the early 1990s. The Coast Guard and the Research and Special Programs Administration have also devoted little effort to evaluating and developing GPS' capability as a civil marine and land navigation system. Because LORAN-C can be effectively maintained and reliably operated at least until the early 1990s and because the Coast Guard has not been able to validly demonstrate the cost effectiveness of the replacement program on a station-by-station basis, GAO recommends that the Coast Guard terminate its planned replacement of existing LORAN-C equipment. GAO also recommends that the Coast Guard discontinue developing new LORAN-C applications and focus efforts and resources on demonstrating GPS' potential as a marine and land navigation system. Author (GRA)

N82-17144# Mitre Corp., McLean, Va. Metrek Div.
REQUIREMENTS FOR INSTRUMENT APPROACHES TO CONVERGING RUNWAYS
L. C. Newman, W. J. Swedish, and T. N. Shimi Sep. 1981 116 p refs
(Contract DTFA01-81-C-10001)
(AD-A108075; MTR-81W230; FAA-EM-82-4) Avail: NTIS HC A06/MF A01 CSCL 01/2

This document discusses the technical issues relevant to converging approaches and examines the feasibility of conducting instrument approaches as a means of increasing airport capacity. The main considerations in the analysis were: runaway geometry; missed approach paths; and pilot acceptance. A safety analysis was conducted to determine requirements and control procedures to provide protection against: random lateral variation from the missed approach path; Heading blunder; and rare and unexpected events. Requirements for final and missed approach are presented as are strategies for applying these requirements to airports with a wide variety of converging runway geometries. Preliminary recommended procedures are presented for conducting independent instrument approaches to Category I minima. GRA

N82-17145# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Electrical Engineering.
OPTICAL DATA PROCESSING FOR MISSILE GUIDANCE Annual Report, 1 Oct. 1980 - 31 Sep. 1981
David Casasent 1 Oct. 1981 70 p refs
(Grant AF-AFOSR-0091-79; AF Proj. 2305)
(AD-A107592; AFOSR-81-0730TR) Avail: NTIS HC A04/MF A01 CSCL 17/7

The initial phase of our synthetic discriminant function optical pattern recognition research has been completed. This hyperspace description allows the use of off-line synthesis of a filter function that provides both intra-class recognition (of a key object independent of geometrical distortions) and inter-class discrimination (of a key object from candidate false targets). A new theoretical model for multi-sensor data, a description of a general multi-sensor processor and a statistical analysis of both have also been completed. Initial experimental correlations were obtained and found to be in agreement with our model and theoretical analysis. A new parameter, the correlation measure, was found to be of use in determining the multi-sensor nature of input imagery and a (GRAD) digital preprocessing operator was found to be quite adequate for the cases considered. Our initial optical correlations on the autonomous terminal homing data base were also completed. In this research, aperture correlation effects were overcome by a new technique, optical and digital correlations on the same data base were obtained and compared (with a high pass filter model for the optical matched filter found to be adequate and appropriate for many applications), and sensed/synthetic optical image correlations were obtained (with the help of photoreduced imagery and advanced preprocessing operations). Author (GRA)

N82-17146# Systems Control, Inc., Palo Alto, Calif.
DIFFERENTIAL OMEGA SYSTEM DEVELOPMENT AND EVALUATION Final Report, 27 Aug. 1977 - 15 Aug. 1981
T. M. Watt, L. E. Abrams, and F. G. Karkalik Washington FAA Aug. 1981 105 p refs
(Contract DOT-FA75WA-3662)
(AD-A107857; FAA-D-81-69) Avail: NTIS HC A06/MF A01 CSCL 17/7

This report describes a development and evaluation program for Differential Omega in general aviation. The program was a cooperative venture between the FAA and Transport Canada. SCT performed system design, program management, and flight test on behalf of the FAA. Tracor, Inc. provided modified Omega airborne receivers under subcontract to SCT. Flight tests took place in Alaska aboard a Convair 580 provided by the FAA. Monitor stations were located in Anchorage and at Deadhorse. The most definitive results were obtained from flight tests conducted in October 1980 and February 1981. Important results included: (a) data-link range varied from 44 nm to 198 nm, (b) random component of navigation error was 0.25 nm, 2-D RMS, (c) range decorrelation error was about 2 nm over a distance of 550 nm, (d) transient response of the system-following aircraft procedure turns was characterized by a positional overshoot of about 1.5 nm, followed by a monotonically decreasing error with a two-minute time constant. Recommendations are made for improving system performance. Author (GRA)

N82-17147# Test Group (6585th), Holloman AFB, N. Mexico
PROCEEDINGS OF THE TENTH BIENNIAL GUIDANCE TEST SYMPOSIUM, VOLUME 1
Robert G. Brown, Harold D. Morris, Philip D. Flanner, Robert T. Callahan, and B. Katz Oct. 1981 282 p refs Meeting held at Holloman AFB, N. Mex., 7-9 Oct. 1981
(AD-A107612; AD-TR-81-38-Vol-1) Avail: NTIS HC A13/MF A01 CSCL 17/7

These proceedings contain papers included in the Tenth Biennial Guidance Test Symposium. This symposium, hosted by the Central Inertial Guidance Test Facility, is directed toward the exchange of information, stimulation of new ideas, and discussion of recent developments in the field of guidance testing. The papers presented include such topics as the use of the Global Positioning System, Aircraft Inertial Navigators, Component Evaluation, Advanced Guidance Methodology, Missile Guidance Systems, and Analysis Techniques. The included papers are those presented in the unclassified sessions of the symposium. Papers presented in the classified portions of the meeting are being published as Volume II. Author (GRA)

N82-17148# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
ACTIVE BEACON COLLISION AVOIDANCE LOGIC EVALUATION. VOLUME 2: COLLISION AVOIDANCE (BCAS) THREAT PHASE Final Report, Apr. 1979 - Jun. 1980
A. Adkins, J. Thomas, B. Billmann, and J. Windle Sep. 1981 59 p refs
(FAA Proj. 052-241-320)
(AD-A107805; FAA-CT-80-51-2-Vol-2; FAA-RD-80-125-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

The purpose of this project was to evaluate and refine the April 1979 version of the Beacon Collision Avoidance System (BCAS) logic prior to Active BCAS prototype flight testing. The April 1979 version of the BCAS logic added changes to support multiple aircraft conflict resolution, Conflict Indicator Register (CIR) interfacing and new surveillance logic interfacing. The results of the first phase of the Active BCAS logic, evaluating the Air Traffic Control Radar Beacon System (ATCRBS) threat phase, identified several improvements that should be made to the BCAS logic. These improvements were incorporated into the logic prior to beginning the second phase, the BCAS equipped threat phase. The second phase was conducted from September to November 1979 and was designed to evaluate the BCAS performance against BCAS equipped threats. The results are presented in this report. Several logic improvements have been identified. These changes have been implemented in both the threat logic and the BCAS command coordination logic (CIR logic). In general, BCAS performance for equipped threats was not as sensitive to vertical rate tracker noise as in the ATCRBS threat case. Resolution performance has been improved through a reduction in undesirable BCAS alarms and by reducing excessive separation with the inclusion of a projected vertical miss distance (VMD) filter for equipped threats. A better method of selecting threat volume parameters has been incorporated. GRA

N82-17149# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
INVESTIGATION OF WILCOX MODEL 585B VERY HIGH FREQUENCY OMNIDIRECTIONAL RADIO RANGE (VOR) SYSTEM, PART 3 Final Report, Mar. 1980 - Feb. 1981
Wayne E. Bell Oct. 1981 53 p refs
(FAA Proj. 041-305-830)
(AD-A107855; FAA-CT-81-46; FAA-RD-81-52; ACT-100) Avail: NTIS HC A04/MF A01 CSCL 17/7

A three-part investigation of the Wilcox 585B Very High Frequency Omnidirectional Radio Range (VOR) System was conducted. In Part 1, the magnitude of the ground error was reduced by modification and suitable adjustment of antenna element lengths of the field detector. In Part 2, investigation developed an acceptable calibration procedure for system 30 hertz (Hz) modulation. Obtaining compatible 30 Hz modulation reading between aircraft (far-field) and edge of counterpoise (near-field) measurements was an additional requirement. In Part 3, tests resolved any discrepancies in the tuning adjustments

prescribed by the manufacturer's equipment manuals. This report, which is the last in a series of three, contains an outline of the tests and procedures for setting the lengths of the adjustable field detector elements, a recommended procedure for obtaining compatible near-field and airborne 30 Hz modulation readings, and recommended changes to the manufacturer antenna tuning procedures in order that the system meet required operational tolerances. Author (GRA)

N82-17150# Air Navigation Services, Inc., Westerngrund (West Germany).
AERONAUTICAL INFORMATION DATA SUBSYSTEM (AIDS): A GROUND-BASED COMPONENT OF AIR NAVIGATION SERVICES SYSTEMS
Frank W. Fischer 1981 5 p Presented at 11th AIDS Symp., Cologne, 22-24 Sep. 1981 Sponsored by DFVLR
Avail: NTIS HC A02/MF A01

The construction of an air navigation services information data base for internal and external use (airspace users before and during flight) of internally and externally produced information data is advocated. A data bank, which holds all current operational information data, controls the data switching and processing machine which constitutes the data communication subsystem. Benefits of AIDS include costs in data compiling and the provision of precise data for air traffic control, flight planning or rescue operations. Apart from the airlines, AIDS is of most use to general aviation operators. Author (ESA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-17151*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
USE OF OPTIMIZATION TO PREDICT THE EFFECT OF SELECTED PARAMETERS ON COMMUTER AIRCRAFT PERFORMANCE Progress Report
Valana L. Wells and Richard S. Shevell Feb. 1982 45 p refs
(Grant NAG1-202)
(NASA-CR-168439) Avail: NTIS HC A03/MF A01 CSCL 01C

The relationships between field length and cruise speed and aircraft direct operating cost were determined. A gradient optimizing computer program was developed to minimize direct operating cost (DOC) as a function of airplane geometry. In this way, the best airplane operating under one set of constraints can be compared with the best operating under another. A constant 30-passenger fuselage and rubberized engines based on the General Electric CT-7 were used as a baseline. All aircraft had to have a 600 nautical mile maximum range and were designed to FAR part 25 structural integrity and climb gradient regulations. Direct operating cost was minimized for a typical design mission of 150 nautical miles. For purposes of C sub L sub max calculation, all aircraft had double-slotted flaps but with no Fowler action. T.M.

N82-17152*# Goodyear Aerospace Corp., Akron, Ohio.
PRELIMINARY DESIGN STUDY OF A HYBRID AIRSHIP FOR FLIGHT RESEARCH
Ronald G. E. Browning Jul. 1981 286 p refs
(Contract NAS2-10777)
(NASA-CR-166246; GER-17016) Avail: NTIS HC A13/MF A01 CSCL 01C

The feasibility of using components from four small helicopters and an airship envelope as the basis for a quad-rotor research aircraft was studied. Preliminary investigations included a review of candidate hardware and various combinations of rotor craft/airship configurations. A selected vehicle was analyzed to assess its structural and performance characteristics. Author

N82-17153*# Lockheed-California Co., Burbank.
SYSTEMS STUDY OF TRANSPORT AIRCRAFT INCORPORATING ADVANCED ALUMINUM ALLOYS Final Report
I. Frank Sakata Jan. 1982 187 p refs
(Contract NAS1-16434)
(NASA-CR-165820; LR-29984) Avail: NTIS HC A09/MF A01 CSCL 01C

A study was performed to quantify the potential benefits of utilizing advanced aluminum alloys in commercial transport aircraft and to define the effort necessary to develop fully the alloys to a viable commercial production capability. The comprehensive investigation (1) established realistic advanced aluminum alloy property goals to maximize aircraft systems effectiveness (2) identified performance and economic benefits of incorporating the advanced alloy in future advanced technology commercial aircraft designs (3) provided a recommended plan for development and integration of the alloys into commercial aircraft production (4) provided an indication of the timing and investigation required by the metal producing industry to support the projected market and (5) evaluate application of advanced aluminum alloys to other aerospace and transit systems as a secondary objective. The results of the investigation provided a roadmap and identified key issues requiring attention in an advanced aluminum alloy and applications technology development program. Author

N82-17154* Textron Bell Helicopter, Fort Worth, Tex.
CORRELATING MEASURED AND PREDICTED INPLANE STABILITY CHARACTERISTICS FOR AN ADVANCED BEARINGLESS ROTOR Final Report
William H. Weller Jan. 1982 72 p refs
(Contract NAS2-10772)
(NASA-CR-166280; Rept-699-099-046) Avail: NTIS HC A04/MF A01 CSCL 01C

The experimental data were obtained from hover tests for a scaled model of an advanced bearingless main rotor. Both isolated rotor and ground resonance conditions were tested. Test parameters included blade built-in cone and sweep angles, rotor inplane structural damping, pitch link location and fuselage structural damping. Analytical results for the conditions tested were obtained using current Bell Helicopter analyses. In addition, variations in the analytical models were made to assess their impact on the correlation between computed and measured results. Results are presented in tabular and graphical form. T.M.

N82-17155# Arinc Research Corp., Santa Ana, Calif.
TECHNOLOGY OVERVIEW FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
H. Rosenberg, R. Brooks, J. Alderman, K. Braman, G. OBryan, and G. Wright May 1981 284 p refs
(Contract N60530-80-C-0270)
(AD-A107680; Rept-1789-01-1-2406) Avail: NTIS HC A13/MF A01 CSCL 01/3

Presented herein are overviews of state-of-the-art technologies applicable to the Stores Management System and Suspension and Release Equipment of the Advanced Aircraft Armament System. Technology briefs are presented for selected areas, and references are made to detailed sources of desired information. Author (GRA)

N82-17156# Arinc Research Corp., Santa Ana, Calif.
STANDARDIZATION STUDY FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
Larry J. Graham and William G. Schulz May 1981 103 p refs
(Contract N60530-80-C-0339)
(AD-A107681; Rept-1783-01-1-2405) Avail: NTIS HC A06/MF A01 CSCL 01/3

Results of a 6-month study of standardization criteria and characteristics are presented that may be effectively applied to the Advanced Aircraft Armament System (AAAS) Program. System elements feasibly for standardization are identified. Standardization characteristics for those feasible elements are developed for various levels of standardization (subsystem, module, piece part) and standardization approaches (horizontal, vertical, area, functional, logistical, and cooperative). Alternative standardization characteristics are also postulated and recommendations are formulated for application to the AAAS Program. Author (GRA)

N82-17157# Hochschule der Bundeswehr, Munich. (West Germany). Fachbereich Luft- und Raumfahrttechnik.

OPTIMAL DOLPHIN HANG GLIDER FLIGHT [OPTIMALER DELPHIN-SEGELFLUG]
E. D. Dickmanns Mar. 1981 71 p refs In GERMAN
Avail: NTIS HC A04/MF A01

Time minimal gliding flight in vertical air currents is discussed. If the vertical current wavelength is large as opposed to the trajectory oscillation taken by an airplane, an optimal flight with approximately n sub z = 1 can be obtained. In short vertical currents the dynamic warming up maneuver in the downwind gives great advantages. During the transition local conditions may interfere. Two fundamentally different control maneuvers of equal value to the sail functions are described. Transl. by E.A.K.

N82-17158# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
THE ARMED HELICOPTER IN AIR TO AIR MISSIONS
Emil Weiland 1981 18 p Presented at Royal Aeronautical Soc. Rotorcraft Section Symp., London, 4 Feb. 1981
(MBB-UD-317-81-O) Avail: NTIS HC A02/MF A01

The antihelicopter-helicopter must be superior in performance and agility. The basic vehicle must be supplemented by a specialized armament demonstrating a combination of guns and fire and forget air to air missiles. In order to ensure a system superior to the possible enemy gunship, the helicopter needs to be designed to take full advantage of the inherent performance and agility potential of the basic helicopter elements. The agility aspect of the rotorcraft inherent characteristics of the major rotorcraft components are discussed and a possibility for a practical solution is indicated. Author

N82-17159# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Hauptabt. Aeromechanik.
APPLICATIONS OF STOCHASTIC DIFFERENTIAL EQUATIONS IN FLIGHT MECHANICS
Karl-Heinz Keil 15 May 1981 53 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(MBB-UA-589-81-O; LFF-8002-5) Avail: NTIS HC A04/MF A01

The behavior of the mean values and covariances of states of stochastically influenced systems in flight mechanics can be analyzed using the covariance theory of linear systems and statistical linearization if the models are not too complex. The necessary mathematical tools (random processes and stochastics differential equations, white and colored noise) are explained. These analytical methods are applied to a simplified model of the automatic landing approach influenced by turbulence. The limitation of the elevator acts as a nonlinearity. Author

N82-17160# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
DESIGN MANUAL FOR IMPACT DAMAGE TOLERANT AIRCRAFT STRUCTURE
John G. Avery (Boeing Military Airplane Co., Seattle) Oct. 1981 230 p refs Sponsored in part by Dept. of Defense
(AGARD-AG-238; ISBN-92-835-1403-3) Avail: NTIS HC A11/MF A01

The structural design information is grouped into three major sections: description of projectile threats; analysis methods for predicting structural response to projectile impact; and design guidelines for impact tolerance. The hydrodynamic ram effect and aircraft engine disintegration are highlighted. For individual titles, see N82-17161 through N82-17170.

N82-17161# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DESCRIPTION OF PROJECTILE THREATS
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 1-24 refs (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Evaluating the degradation of aircraft structure resulting from projectile impact requires a knowledge of the threat and encounter conditions. This is necessary in understanding the failure mechanisms and structure response modes induced by the various types of threats. Projectile types, important encounter parameters, and typical terminal effects are discussed. Information that is helpful in understanding the analysis of structural response to impact and the design guidelines for impact damage tolerance is presented. T.M.

N82-17162# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS METHODS FOR PREDICTING STRUCTURAL RESPONSE TO PROJECTILE IMPACT
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 27-44 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Analysis methods and data available for predicting the response of metal and fiber composite structure to projectile impact are presented. The analysis methods discussed are applicable to impacts from small arms projectiles, missile warhead fragments, and the fragmentation and blast effects of high-explosive projectiles. The responses addressed include penetration capability, damage size and type, strength degradation of damaged structure, and internal load redistribution. T.M.

N82-17163# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS METHODS FOR BALLISTIC DAMAGE SIZE AND TYPE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 45-78 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The parameters which influence the size and character of projectile impact damage are described. Predicting damage size is the first step is assessing the structural capability of impacted structure, since damage size determines net section strength loss, stiffness loss, and the flaw size for failure analysis. The discussion is organized according to projectile type as follows: non-exploding projectiles; high explosive projectiles; and engine debris projectiles. Within each projectile category the responses of both metallic and fiber composite structure are discussed. The effects of fluid pressure in causing damage, a phenomenon known as hydrodynamic ram, are discussed. T.M.

N82-17164# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DAMAGE FROM HIGH EXPLOSIVE (HE) PROJECTILES
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 79-135 refs (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The structural damage done by HE projectiles (20- to 30-mm, for example) is the result of multiple fragment penetrations and internal blast pressures, acting separately and in combination. The fragments are created as the metal casing surrounding the explosive bursts due to the intense pressures generated by the detonation. Fragment damage degrades structural strength and stiffness, and blast pressures added to the existing flight loads can cause excessive deformations and element failures. The nature and extent of structural damage from HE projectile fragments and blast pressure depend upon these variables: material type and thickness; projectile size and delay characteristics; striking velocity and obliquity; distance from detonation to impacted structure (standoff); and internal volume of structural cell and extent of venting. The significance of each of these variables is discussed. Qualitative descriptions of HE projectile damage in metallic and fiber composite structure are presented followed by a discussion of damage prediction analysis techniques for blast and fragments. T.M.

N82-17165# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DAMAGE FROM ENGINE DEBRIS PROJECTILES
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 136-139 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The effects of uncontained projectile emanating from an engine and subsequently striking an adjacent portion of the airframe are assessed. The effects are treated the same as for effects resulting from nonexploding military projectiles. There is an important distinction, however, in that the engine debris projectile

is typically an irregular fragment (as opposed to a bullet), behaving more like a warhead fragment or the fragments generated from a high-explosive projectile. T.M.

N82-17166# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HYDRODYNAMIC RAM DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 140-152 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Hydrodynamic ram is a phenomenon that may cause extensive structural failure of aircraft fuel cells when they are subjected to ballistic impact. During impact and penetration of the fuel cell, intense pressure waves are generated within the liquid by the projectile. The response of the fuel cell to this pressure loading varies according to its construction. For example, the walls of an integral fuel cell are formed by the aicraft skin, which is usually constructed of high-strength metal designed to withstand normal flight loads. This type of structure can fail catastrophically in response to hydrodynamic ram pressure loading due to fracturing of the walls of the cell. Self-sealing fuel cells can also be defeated due to hydrodynamic ram by gross tearing of the material or by misalignment of the wound edges, thereby defeating the self-sealing process. Both of these effects become increasingly severe as fuel cells become smaller, or projectile kinetic energies increase. An analysis method to predict hydrodynamic ram pressures generated by small arms ammunition was developed. The analysis method is based on the conversion of projectile kinetic energy to pressure field energy and includes the effects of reflections from the tank walls. T.M.

N82-17167# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
EFFECTS OF CYCLIC LOADING ON PROJECTILE IMPACT DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 153-157 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

The cyclic loading induced during flight can influence the severity of existing impact damage by initiating fatigue cracks at the damage site, subsequent crack sharpening or blunting and crack growth. There can be significant time dependent changes in the residual strength of the structure due to these alterations in the size and character of the impact damage. Projectile produce a wide variety of damage types, including cracks, holes, tears, large determination, even totally severed structural elements. The response of the damaged structure when exposed to cyclic loads reflects this wide variety of structural damage. For example, the cyclic loading can result in immediate growth when the projectile damage is a crack. There may be, however, a time (number of cycles) devoted to crack nucleation. Several important aspects of the fatigue response of impact damaged structure are described in terms of crack initiation and extension. An approach which basically consists of assuming immediate fatigue crack initiation at the damage site, and then applying conventional crack growth analysis is suggested. T.M.

N82-17168# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
STIFFNESS DEGRADATION OF IMPACT DAMAGED STRUCTURE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 159-160 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Stiffness reduction in impact damaged structural elements can be important from two standpoints. The first is the alteration of load distribution within the structure, potentially causing overloading and failure of undamaged elements. The second area of potential concern is the residual stiffness of major structural components, since stiffness degradation may lead to instability and control inadequacy. These two topics are discussed, however, there are few verified analysis methods for predicting stiffness degradation associated with ballistic damage. Both of these stiffness degradation effects, but particularly the latter, become increasingly significant as the extent of the inflicted damage becomes larger. Stiffness degradation may well be a problem for HE projectile impacts, but it is generally insignificant with small arms. T.M.

N82-17169# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
STRENGTH DEGRADATION OF IMPACT DAMAGED STRUCTURE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 161-194 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Projectile damage destroys a portion of the load carrying capability of the structure, alters the distribution of internal loads, and introduces a flaw which may cause failure by locally disturbing the stress field. The latter effect is most significant with regard to the relatively small damage induced by small arms projectile and dispersed warhead or engine debris fragments. High explosive projectiles can often create damage of sufficient size to substantially degrade structural performance by all three effects. Estimating the residual strength of structure damaged by projectile impact is a major step in predicting structural capability. The analysis methods presented for evaluating strength capability are organized according to structural complexity: analysis of monolithic panels; analysis of multiple load path panels; and analysis of multielement structure. The application of conventional and modified fracture mechanics analysis to ballistic damaged panels is discussed. The extension of these approaches to the requirements of panels having discrete stiffening members are discussed. T.M.

N82-17170# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS OF MULTIPLE LOAD PATH PANELS CONTAINING IMPACT DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 195-209 (For primary document see N82-17160 08-05)
Avail: NTIS HC A11/MF A01

Many structural configurations cannot be represented as monolithic panels in assessing strength degradation from impact damage. The wings of transport aircraft, for example, often consist of skin with riveted stiffeners. The stiffeners can provide damage containment or crack assessment capability that is not considered in element residual strength analysis. Since the crack arrestment capability can significantly improve the residual strength of damaged structure, the stiffening must be included in the analysis. The response of stiffened panels to projectile damage, and available analytical techniques for residual strength prediction, are discussed. T.M.

N82-17118# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
MIRAGE 2000 WEAPONS SYSTEMS ARCHITECTURE [ARCHITECTURE DU SYSTEME D'ARMES DU MIRAGE 2000]
S. Croce-Spinelli, B. Vandecasteele, and J. F. Ferreri *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17120# Naval Weapons Center, China Lake, Calif. F-18 Facility Branch.
F/A-18 WEAPONS SYSTEM SUPPORT FACILITIES
Thomas F. O'Neill *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-17171# McDonnell Aircraft Co., St. Louis, Mo.
CORROSION CONTROL TEST METHOD FOR AVIONIC

COMPONENTS Final Report, 27 Sep. 1979 - 27 May 1981
A. W. Morris 25 Sep. 1981 60 p refs
(AD-A108061; NADC-81174-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The program objective was to develop an accelerated laboratory corrosion test capable of simulating the severe corrosive effects of an aircraft carrier deployment environment. The current standard 5% salt fog test is not severe enough to simulate the carrier environment, thus limiting its usefulness in forecasting corrosion failures. To provide test standards, representative electrical and electronic units were exposed on an oil burning carrier during a 9 month tropical cruise and on a nuclear carrier during a 10 month tropical cruise. A series of laboratory tests were run to identify corrosion environments which provide good correlation with actual carrier results. The tests were also judged on their ability to promote moisture related electrical failures. During the final phase of the program, 25 electronic and electrical components were exposed to the two most promising test methods. The selected test method is a modification of the NADC sulfur dioxide salt fog test. It utilizes a much higher exposure temperature and a dilute substitute ocean water solution for fog generation. In one week this test method produces both corrosion damage and electrial failures that correlate with the condition of the test articles exposed for nine to ten months on an aircraft carrier. Author (GRA)

N82-17172# Systran Corp., Dayton, Ohio.
DIGITAL AVIONICS INFORMATION SYSTEM (DAIS) DOCUMENTATION Final Report, Aug. 1979 - Jun. 1981
F. Forster and R. Gregory Wright-Patterson AFB, Ohio AFWAL Sep. 1981 97 p
(Contract F33615-79-C-1818; AF Proj. 2052)
(AD-A108000; AFWAL-TR-81-1162) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report covers the work performed by SYSTRAN Corporation in providing Configuration control, technical editing and generation of documentation for the DAIS Program Branch. This effort encompassed the following functions: (1) maintaining the DAIS library, (2) generating certain specifications, plans, drawings and/or test reports, (3) performing configuration audits per MIL-STD-1521, (4) assuring that DAIS documents conformed to MIL-STD-490 and 483, (5) technical editing and configuration control over all DAIS documentation. The DAIS documentation effort was highly successful and could set an example for other R&D programs on how to properly document their efforts in MIL-STD format. Author (GRA)

N82-17173# Naval Research Lab., Washington, D. C.
FUNCTION SPECIFICATIONS FOR THE A-7E FUNCTION DRIVER MODULE Interim Report
P. C. Clements 27 Nov. 1981 177 p refs
(XF21242101)
(AD-A107922) Avail: NTIS HC A09/MF A01 CSCL 09/2

As part of the experimental redesign of the flight software for the Navy's A-7E aircraft, software modules were designed to encapsulate the characteristics of the behavioral requirements of the system. The purpose of these Function Driver modules is to allow the remainder of the software to remain unchanged when the required system behavior is modified without associated hardware changes. This document specifies the behavior of the system without regard to specific hardware devices. This report contains an explanation of the standard organization of each functional description, a description of the review procedures, specifications for all of the functional aspects of the A-7E software, and a set of indices and cross-references to help integrate this module with the rest of the system. As well as serving as development and maintenance documentation for the A-7E redesign, this document is intended to serve as a model for other people interested in applying our documentation and structuring techniques to other software projects. Author (GRA)

N82-17088# Ferranti Ltd., Bracknell (England). Computer Systems Div.
THE EFFECT OF INCREASINGLY MORE COMPLEX AIRCRAFT AND AVIONICS ON THE METHOD OF SYSTEM DESIGN
J. T. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 5 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17089# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.
A TUTORIAL ON DISTRIBUTED PROCESSING IN AIRCRAFT/AVIONICS APPLICATIONS
Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17090# Rensselaer Polytechnic Inst., Troy, N. Y. Electrical, Computer, and Systems Engineering Dept.
PERFORMANCE STUDY OF A DISTRIBUTED MICROPROCESSOR ARCHITECTURE FOR USE ABOARD MILITARY AIRCRAFT
Kang G. Shin and C. M. Krishna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 13 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17092# Elektronik-System G.m.b.H., Munich (West Germany).
FUNCTIONAL VERSUS COMMUNICATION STRUCTURES IN MODERN AVIONIC SYSTEMS
K. Brammer and A. Weimann *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF 01

N82-17097# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.
ECONOMIC CONSIDERATIONS FOR REAL-TIME NAVAL AIRCRAFT/AVIONICS DISTRIBUTED COMPUTER CONTROL SYSTEMS
Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17105*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
METHODOLOGY FOR MEASUREMENT OF FAULT LATENCY IN A DIGITAL AVIONIC MINIPROCESSOR
John C. McGough, Fred Swern, and Salvatore J. Bavuso *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p refs Prepared in cooperation with Bendix Corp., Teterboro, N.J. (For primary document see N82-17086 08-01)
(Contract NAS1-15946)
Avail: NTIS HC A18/MF A01 CSCL 01D

N82-17111# British Aerospace Aircraft Group, Brough (England). Avionics Systems Div.
PRACTICAL ASPECTS WHICH APPLY TO MIL-STD-1553B DATA NETWORKS
I. Moir (Smiths Industries Aerospace and Defense Systems Co., Cheltenham, England) and P. A. Duke *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17114# Hughes Aircraft Co., Fullerton, Calif.
NEXT GENERATION MILITARY AIRCRAFT WILL REQUIRE HIERARCHICAL/MULTILEVEL INFORMATION TRANSFER SYSTEMS
James W. McCuen *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17115# Bendix Corp., Teterboro, N. J. Flight Systems Div.
SIFT: AN ULTRA-RELIABLE AVIONIC COMPUTING SYSTEM

Kurt Moses *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17117# Royal Aircraft Establishment, Farnborough (England).
INTEGRATED CONTROL OF MECHANICAL SYSTEM FOR FUTURE COMBAT AIRCRAFT
G. W. Wilcock, P. A. Lancaster, and C. Moxey *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs Prepared in cooperation with British Aerospace, Warton Sponsored in part by Procurement Executive MOD (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17119# McDonnell Aircraft Co., St. Louis, Mo.
F/A-18A TACTICAL AIRBORNE COMPUTATIONAL SUB-SYSTEM
T. V. McTigue *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-17174*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
CF6 JET ENGINE PERFORMANCE IMPROVEMENT: HIGH PRESSURE TURBINE ROUNDNESS
W. D. Howard and W. A Fasching Jan. 1982 136 p refs
(Contract NAS3-20629)
(NASA-CR-165555; R82AEB115) Avail: NTIS HC A07/MF A01 CSCL 21E

An improved high pressure turbine stator reducing fuel consumption in current CF6-50 turbofan engines was developed. The feasibility of the roundness and clearance response improvements was demonstrated. Application of these improvements will result in a cruise SFC reduction of 0.22 percent for new engines. For high time engines, the improved roundness and response characteristics results in an 0.5 percent reduction in cruise SFC. A basic life capability of the improved HP turbine stator in over 800 simulated flight cycles without any sign of significant distress is shown. E.A.K.

N82-17175*# Pennsylvania State Univ., University Park. Turbomachinery Lab.
THREE DIMENSIONAL FLOW FIELD INSIDE COMPRESSOR ROTOR, INCLUDING BLADE BOUNDARY LAYERS Semiannual Progress Report
M. Pouagare, J. M. Galmes, B. Lakshminarayana, and K. N. Sachidananda Murthy Jan. 1982 87 p refs
(Grant NsG-3266)
(NASA-CR-168410; PSU/TURBO-82-1) Avail: NTIS HC A05/MF A01 CSCL 21E

The flow in a turbomachinery blade passage has a predominant flow direction. The viscous diffusion in the streamwise direction is usually small and the elliptic influence is transmitted upstream through the pressure field. Starting with a guessed pressure field, it is possible to converge on the full elliptic solution by iterating between a parabolic solution and an iteration of the pressure field. The main steps of the calculation are given. The blade boundary layers which are three dimensional with laminar, transitional, turbulent, and separation zones are investigated. The kinetic energy is analyzed, and the dissipation equation is presented. Measurements were made of the three dimensional flow inside an axial flow compressor passage. S.L.

N82-17176# Pratt and Whitney Aircraft Group, West Palm Beach, Fla.
DAMAGE TOLERANT DESIGN FOR COLD-SECTION TURBINE ENGINE DISKS Final Report, Aug. 1977 - Feb. 1981
C. H. Cook, H. E. Johnson, and C. E. Spaeth Wright-Patterson AFB, Ohio AFWAL Jun. 1981 243 p
(Contract F33615-77-C-2064; AF Proj. 3066)
(AD-A107863; PWA-FR-14442; AFWAL-TR-81-2045) Avail: NTIS HC A11/MF A01 CSCL 21/5

This report describes the development, test evaluation, and refinement of a Damage Tolerant Design System for cold-section turbine engine disks. To substantiate the Design System the 42-month effort included the design and test of a functional replacement 2nd-stage fan disk for the F100 engine. This disk would be able to support a 0.030-inch crack for three maintenance intervals without a rapid fracture failure. The program was totally successful and resulted in a disk design that was three pounds heavier than the Bill of Material (B/M) disk but had over ten times the B/M life even with a 0.030-inch crack in the bolthole and a 0.020 inch elox crack starter in the rim slot. Included in this report are the design criteria and rationale used in creation of the damage tolerant configuration, the testing and analysis methodology, and results as well as recommendations for application and improvements. GRA

N82-17177# Strategic Air Command, Offutt AFB, Nebr. Aircraft Engineering Div.
MAINTENANCE POSTURE FOR QUICK START Final Report
John M. Connolly 12 Aug. 1981 46 p
(AD-A107553; SAC/LGME-ER-P-328) Avail: NTIS HC A03/MF A01 CSCL 12/5

Quick start is an aircraft modification which installed cartridge starters on all engines of the B-52G/H and non-fan KC-135 aircraft. Routine peacetime use of the modification was suspended due to an excessive amount of smoke and toxic gases created by the cartridge exhaust. The SAC Aircraft Engineering Division then investigated respiratory and eye protection for ground crew personnel. As an interim solution, they found that an aircraft firefighter's smoke mask connected to a Mine Safety Appliance Corp Type N model SW as filter canister adequately protects the user. To minimize the crew chief's exposure to the smoke cloud, the Division designed and tested a roll-over chock, evaluated a wireless interphone communication system, and implemented alert B-52 battery engine starts. With these new concepts, response timing is only limited to aircrew checklist items and engine start time. GRA

N82-17178# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THROUGH FLOW CALCULATIONS IN AXIAL TURBOMACHINES
C. Hirsch, ed. (Vrije Universiteit, Brussels) and J. D. Denton, ed. (Cambridge Univ.) Oct. 1981 330 p refs
(AGARD-AR-175) Avail: NTIS HC A15/MF A01

The objectives were to review the existing information on blade performance and wall effect prediction, and to extend this information by systematic application of numerical methods to representative geometries. Only axial turbomachines were examined and they were split into a turbine sub-group and a compressor sub-group. Axial turbine performance predicted included an examination of the influence of correlations and computational procedures on the prediction of overall efficiency. A comprehensive survey of the various loss and deviation mechanisms was conducted for the compressor sub-group. For individual titles, see N82-17179 through N82-17202.

N82-17179# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
REVIEW OF PERFORMANCE PREDICTION METHODS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 13-28 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The methods are split into two major categories. The first category groups together the so-called overall stage methods. The use of such methods does not in general require any details of the blading and the complex flow patterns in the turbine are deliberately ignored. Turbines are treated more or less as black boxes. These methods are in general derived from overall performance measurements of a large number of turbines with similar characteristics. Their use is justified in the initial design phase for the selection of the turbine design parameters. The optimization of a turbine for a given duty requires, however, a deep understanding of the flow, and only very refined performance prediction methods, which take into account details of the blading and of the meridional flow channel, can be of real help. This is attempted by the second category of performance estimation methods which evaluate the total losses as the sum of a great number of individual loss components, each of which is influenced by a large number of geometric and aerodynamic parameters. T.M.

N82-17180# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
INFLUENCE OF CORRELATIONS AND COMPUTATIONAL METHODS ON THE PREDICTION OF OVERALL EFFICIENCY
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 29-31 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The process of designing a gas turbine or a steam turbine begins with an evaluation of the influence of component design parameters on the overall cost. For both the steam turbine and the gas turbine, energy costs are rapidly increasing and component efficiency is therefore a primary design objective. For the aircraft gas turbine, the weight of the component influences the fuel consumption and is therefore also an important energy cost consideration. Turbine efficiency predictions, together with information which influence the weight and cost were obtained from flow field calculations which define the thermodynamic properties and velocity triangles throughout the turbine. These computational methods may be full span through flow calculations which predict the fluid properties from the hub to the tip between each blade row or they may be mean line calculations. In either case they are dependent upon loss and deviation models for their effectiveness in the efficiency optimization stage of the design process. The loss and deviation correlations which are in common use by steam turbine and gas turbine manufacturers are frequently developed internally and are maintained as proprietary information. The overall efficiency predictions which are discussed are therefore limited to results obtained using the correlations built into the methods which are described. T.M.

N82-17181# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
INFLUENCE OF CORRELATIONS AND COMPUTATIONAL PROCEDURES ON FLOW FIELD PREDICTIONS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 33-56 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

In order to understand the influence of the empirical input on the results of through flow calculations it is necessary to examine the relative magnitudes of the terms in the radial equilibrium equation. This equation is effectively the momentum equation applied along quasi-orthogonal lines which are roughly perpendicular to the streamlines through the machine. The influences of the streamline slope and curvature, the blade exit, and the loss estimate were examined. The distribution of secondary deviation is discussed. Three dimensional calculations are presented for a two stage gas turbine. T.M.

N82-17182# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CAMBRIDGE TURBINE: GEOMETRY, TEST DATA AND SAMPLE CALCULATION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 59-68 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The turbine is a free vortex design with hub:tip ratio 0.7 and with incompressible flow. Hence in the absence of viscous and secondary flow effects the axial velocity profiles would be everywhere uniform and constant. At design conditions there should be no absolute swirl at exit from the rotor and the experimental flow rate was set to satisfy this condition at mid-height. The turbine was tested with various values of rotor-stator spacing but only results for a single build were used for comparison with calculations. This build has a larger stator-rotor gap than is usual in axial turbine design practice. Details of the machine and blading are given and all geometrical details are based on design rather than on measured data. T.M.

N82-17183# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE TWO STAGE AERO ENGINE TURBINE
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 69-83 ref (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The turbine was a model of the H.P. and I.P. stages of an aircraft gas turbine with the two rotors running at different speeds. It was 'cold flow' tested using air at 420 K and 2.95 bar. Both hot wire and pressure probe instrumentation was used with radial and circumferential traverses after each blade row. The through-flow program used to provide sample results is based on a method of solution for axisymmetric and steady flow in axial turbomachines; it solves the complete radial equilibrium equation - acounting for enthalpy and entropy gradients and streamline curvature effects - in a specified number of stations ahead of and after the blade rows. An orthogonal curvilinear system of coordinates, having the meridional coordinates coincident with the generatrices of the flow stream surfaces, is used in the solution. Overall predicted efficiency is 89.1% of the measured results. T.M.

N82-17184# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANSALDO STEAM TURBINE. GEOMETRY, TEST DATA AND SAMPLE CALCULATION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 85-98 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The turbine geometry is fairly typical of large low pressure 3000 RPM machines, having 6 stages with a very high casing flare to accommodate the large increase of volume flow. This results in very high blade speeds and pressure ratios for the last stage. The Ansaldo machine has a last stage pressure ratio of over 6:1 which, coupled with a low hub:tip radius ratio, results in very high relative Mach numbers at nozzle root and rotor tip. The layout of the turbine is shown and full geometric details of stage 3-6 are given. Details of steam conditions, bleed flow rates and blade clearances are also given. A complete set of all measurements necessary to obtain a heat balance for the turbine were performed in parallel with the traverse measurements. These consisted of 42 pressure, 67 temperature and 6 mass flow measuring devices. The overall electrical output was also monitored and the LP cylinder output was measured by means of a shaft torquemeter and telemetry. These measurements enabled the LP cylinder efficiency to be evaluated separately from that of the whole turbine. Comparisons of measured and computed results are shown. The agreement is good and similar results were obtained from other calculation methods on this machine. T.M.

N82-17185# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HANNOVER TURBINE. GEOMETRY, TEST DATA AND SAMPLE CALCULATION
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 99-107 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The facility was basically laid out for a four-stage turbine which was designed to have the same blade sections in all stages at a given radius. The blading is of the free vortex type and the nominal mass flow of the turbines is m=7.8kg/s and

the nominal rotational speed is 7500 RPM. The set up allows each stage of the four-stage turbine to be tested separately. The tests referred to are concerned only with stage No. 4 which was tested in the single-stage mode. Details of the meridional flow path are presented. The turbine has a constant hub diameter of DH=270 mm. The outer casing is cylindrical except across the blading where it is conical. The rotor has extremely small radial clearances: S=0.24. mm at nominal RPM. The stator is shrouded and the leakage flow across the stator hub is minimized by multiple seals. Predicted efficiency is compared with the measured results. T.M.

N82-17186# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SURVEY ON DIFFUSION FACTORS AND PROFILE LOSSES

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 115-126 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

Emphasis is placed upon the development of stage and blade design procedure that will replace the simple loss prediction techniques in use today. These techniques are difficult to apply to real machine design because extensive iterative hub-to-tip, blade-to-blade, and boundary-layer flow calculation is needed. Parametric studies with blade-to-blade flow and boundary layer calculation codes were examined which attempt to refine the diffusion factor concept and loss correlation at design as well as off-design compressor operation. The codes begin to demonstrate how the flow parameters (including Mach- and Re-number) and the details of blade geometry interact to produce performance characteristics. T.M.

N82-17187# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SURVEY OF MODELS FOR SHOCK AND SHOCK/ BOUNDARY LAYER INTERACTION LOSS PREDICTION

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 127-136 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The calculation of the shock losses has to take into account the losses due to normal shocks as well as the additional losses caused by the shock/boundary layer interaction. Due to the very complex flow behavior, at present this is only possible by empirical correlations for very simplified assumptions. Therefore, additional effort has to be directed to the practical application of analytical methods and to better understanding of the shock/ boundary layer interaction. Basically, transonic cascades have to be designed in such a way that the shocks are not present or occur at minimum shock Mach number. It seems to be possible that for high subsonic inlet Mach numbers the use of new blading design concepts (i.e., supercritical profiles) can meet the first condition, whereas the second condition of minimal shock Mach numbers was successfully verified by the use of wedge type profiles. T.M.

N82-17188# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

END-WALL BOUNDARY LAYER CALCULATION METHODS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 137-150 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The end-wall boundary layer (EWBL) approach to secondary losses is based on the integration of the pitch-averaged three-dimensional boundary layers along the hub and tip walls, with extra assumptions for the blade force defect terms. From there an efficiency drop is calculated including secondary flow effects, as well as blockage. The method allows in principle for the influence of inlet blockage, clearance, axial gap, aspect ratio and other parameters to be included through their effect on the end-wall boundary layers. From the knowledge of the velocity profiles inside the boundary layers, the full radial variations of incidence and turning can be predicted by coupling a radial equilibrium calculation to the EWBL calculation. T.M.

N82-17189# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

CORRELATION FOR SECONDARY FLOWS AND CLEARANCE EFFECTS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 151-165 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

It is concluded that correlations obtained from straight cascade data will at least provide correct trends for the effect of clearance in compressors. With cascade data, the effect of variation of blade circulation with span is not known. This will cause problems if spanwise distributed correction for losses and angle are to be considered. For turbine, it is well known that for secondary flow effect the loss level as obtained from cascade data may differ of an order of magnitude from the machine losses. This is linked most probably to the effect of relative motion when passing from nozzle to rotor or vice-versa. In compressors this effect tends to bring back the end-wall boundary layer to a more collateral state, and the difference might be somewhat less. T.M.

N82-17190# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

EFFECTS OF REYNOLDS NUMBER AND TURBULENCE LEVEL ON AXIAL CASCADE PERFORMANCE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 164-170 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

A semiempirical theory was developed which will predict the behavior of the shear layer across a laminar separation bubble. The method is proposed for two dimensional incompressible flow and is applicable down to short bubble bursting. The method can be used to predict the length of the laminar bubble, the bursting Reynolds number, and the development of the shear layer through the separated region. As such, it is a practical method for calculating the profile losses of axial compressor and turbine cascade in the presence of laminar separation bubbles. It can also be used to predict the abrupt leading edge stall associated with thin airfoil sections. The predictions made by the method are compared with the available experimental data. T.M.

N82-17191# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SURVEY ON THE EFFECT OF BLADE SURFACE ROUGHNESS ON COMPRESSOR PERFORMANCE

In its Through Flow Calculation in Axial Turbomachines Oct. 1981 p 171-180 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

Analysis of limited experimental data reveals that critical roughness Reynolds number of compressor blades manufactured with typical present day methods as forging/etching and electrochemical machining are around 90 and therefore very close to sand type roughness if roughness height is based on the largest peaks. Modern high pressure ratio engines suffer from blade surface roughness in the back stages of the compression system. Surface quality needed to keep the flow hydrodynamically smooth exceeds considerably the best present day quality achievable, thus limiting the potential efficiency gain at high Reynolds number flight conditions, i.e., essentially low level flight conditions. L.F.M.

N82-17192# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

PART SPAN DAMPER LOSS PREDICTION FOR TRANSONIC AXIAL FAN ROTORS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 181-183 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

For off design conditions, the maximum loss due to the damper and region of influence at design point are calculated and these values are used as reference quantities for all off design calculations. The point of intersection of a constant throttle or area operating line through the design point with a speed line defines the reference point where the PSD loss is minimum.

From this point the suction surface incidence at the damper location is determined from experimental data or off design analysis code. Then the damper maximum loss region of influence is calculated for any point on the speed line by taking the difference in suction surface incidence at that point and the reference incidence. To minimize damper loss, several things should be taken into consideration. Both approaches agree on the following: the damper should be as thin as possible so as to minimize the area influenced; the damper should be located as near to the hub as possible; work input should be minimized at the PSD location. Correlation of experimental results shows further that damper trailing and leading edge thickness should be as sharp as possible. L.F.M.

N82-17193# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DEVIATION/TURNING ANGLE CORRELATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 184-211 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

In the past, compressor through flow solutions used substantial input from experimental measurements made in actual fan and compressor flow messages or in flows simulating real compressor conditions. For example, almost total reliance was placed on experimentally supported methods for estimation of fluid turning angles in individual blade rows. Compressor design is, as a result, heavily dependent on the quality of the experiment and data correlations associated with these methods. The three principal currently used prediction methods for flow turning angle were developed during the period 1945 to 1960. One of these methods directly predicts fluid turning angles in terms of cascade geometry and aerodynamic parameters. The others predict the exit flow deviation angle, defined as the angle between the average exit flow direction and the direction of a line tangent to the blade section camber line at the trailing edge. There has been no substantial modernization of these deviation/turning angle procedures since 1960, while during this time the methods have been widely applied to airfoil section profiles and in aerodynamic regimes far outside the limits suggested by the original derivations and data correlations. A discussion of these problems is presented. L.F.M.

N82-17194# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AXIAL COMPRESSOR STALL AND SURGE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 212-213 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The so called surge line evaluation is an extremely complex area, which deserves in itself full attention. The intention here was only to define the problem. The existing methods of prediction do not take the real physics of the flow into account, and cannot explain or consider or identify all the parameters of importance. They are however quick and useful for the range in which they have been calibrated, but are mostly not available in public literature. A more generalized use of the pseudoend wall boundary layer approach seems interesting. Satisfactory solutions will come however only from the logical approach of instability detection, second flow regime and system response characterization, for which solid elements are now in hand but require further development. L.F.M.

N82-17195# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SUMMARY OF ANSWERS TO THE QUESTIONNAIRE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 214-218 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

To ascertain better the state of the art, a questionnaire bearing on particular points raised by the general survey paper of Hirsch was prepared and distributed to industry and research groups. Questions concerning compressor loss correlations, flow turning correlations, and secondary and clearance effects were asked. Answers were received from six countries and a summary is presented. L.F.M.

N82-17196# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SINGLE STAGE TRANSONIC COMPRESSOR AND EQUIVALENT PLANE CASCADE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 221-228 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The working group 12 activities cover primarily turbomachinery off design performance prediction, however include also blade to blade calculation on relevant test cases to get more information on those basic flow phenomena that affect flow losses and turning in blade rows. One of the test cases selected is the DFVLR single stage transonic compressor that was tested in great detail with the results well documented, particularly intrablade velocity data of the rotor are available from extensive flow studies with laser velocimetry. The data allow to compare blade to blade calculations to actual transonic compressor flow. Additionally to the rotor tests the rotor blade section at 45% span was investigated in the DFVLR transonic cascade windtunnel. L.F.

N82-17197# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

BBC/SULZER. 4 STAGE TRANSONIC COMPRESSOR

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 229-244 (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

Tests were performed on the BBC/SULZER 4 stage Transonic Compressor. The overall performance map and some traverse of stagnation pressure and temperature at compressor outlet are presented. L.F.M.

N82-17198# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

RESULTS OF CALCULATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 245-246 ref (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

The types of calculations were performed by various participants, each using his own method for through flow calculations and blade to blade calculations. The Working Group's task was to demonstrate that the use of systematic blade to blade calculations could provide a support for the confirmation of an existing correlation or the development of a new one. It is believed that the present development and state of the numerical tools available in order to compute complex flow structures, should be used more and more extensively in order to develop a deeper understanding of the flow mechanism of loss production and of turning. L.F.M.

N82-17199# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

THE THROUGH FLOW CALCULATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 247-268 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

Through flow calculations of three test cases were performed by various authors belonging to industrial or research organizations. The four-stage transonic compressor, the two-stage compressor, and the single stage compressor are discussed. L.F.M.

N82-17200# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

EVALUATION OF PROFILE LOSS PREDICTIONS BASED ON DIFFUSION FACTORS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 269-280 refs (For primary document see N82-17178 08-07)

Avail: NTIS HC A15/MF A01

A comparison between theoretically predicted and measured profile losses was made, in order to evaluate the precision of the different prediction methods. These prediction methods are based on the relation between suction side diffusion and profile losses. The evaluation concerns as well the prediction of diffusion factor as predicted values of profile losses. It is further shown

that these correlations are not universally valid for all blade shapes and that some correlations perform as well at design as at off design if the suction side diffusion is correctly predicted.
Author

N82-17201# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AXIAL-FLOW TURBOMACHINE THROUGH FLOW CALCULATION METHODS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 285-305 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

Through flow calculation methods are considered to be computational techniques for prediction of fluid velocities and thermodynamic properties at designated locations in the internal flow path of a turbomachine. The objectives are to trace the development of several classes of through flow calculation, to suggest the importance of understanding the assumptions underlying representative examples of each class, and to outline the principal problems in application of through flow methods to current axial-flow compressors and turbines. L.F.M.

N82-17202# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
BLADE-TO-BLADE COMPUTATIONS AND BOUNDARY LAYER CORRECTIONS IN AXIAL COMPRESSORS AND TURBINES
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 307-326 refs (For primary document see N82-17178 08-07)
Avail: NTIS HC A15/MF A01

The number of inviscid calculation methods available today is quite impressive, and they allow an accurate prediction of inviscid incompressible, subsonic compressible and transonic flow. Recent progress has also resulted in a remarkable decrease of required computational effort, which makes them even more attractive to industrial applications. However, as these methods do not account for viscosity, the field of application is quite restricted, and good predictions can be obtained only for flow configurations where viscous effects can be neglected (e.g., turbines and low loaded compressor cascades). A similar conclusion can be drawn about boundary layer methods, with a limitation on shock boundary layer interaction, where complete solutions still require a large amount of computational effort. The combination of these two types of calculations started quite recently, and a lot of progress can be expected in the near future. Improvements which can be expected from a better combination of these two types of calculations will be more important than an improvement in the inviscid calculations. Based on the present state of the art concerning shock boundary layer interaction calculations, it appears that integral or inverse methods are the best suited to industrial calculations. However, in view of the considerable efforts currently made towards the development of the Navier-Stokes equation solution, it is more likely that, in the near future, this method will lead to more reasonable computation times and permit practical applications. L.F.M.

N82-17203# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HELICOPTER PROPULSION SYSTEMS
Sep. 1981 277 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Toulouse, 11-14 May 1981
(AGARD-CP-302; ISBN-92-835-0299-X) Avail: NTIS HC A13/MF A01

Component technology for turboshaft engines and transmissions, inlet protection systems, engine-airframe dynamic compatibility, and future requirements are described. For individual titles, see N82-17204 through N82-17225.

N82-17204# Textron Bell Helicopter, Fort Worth, Tex.
HELICOPTER PROPULSION SYSTEMS: PAST, PRESENT AND FUTURE
Robert R. Lynn and Gordon E. Holbrook *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Helicopter propulsion systems are reviewed, and it is noted that helicopter development is paced to a major extent by the power plant. Power available, reliability, fuel consumption, power-to-weight ratio, and life cycle costs are key parameters. The application of emerging technologies such as microelectronics, ceramics and other new materials and approaches, and the continuing refinement of the aerodynamics and dynamics of gas turbine power plants are discussed and noted to result in a significant benefit to the helicopter and its operator. Important airframe-propulsion system interface requirements are given, and the need is discussed for new innovative certification procedures that provide for emergency operation with acceptable economics. Finally, future propulsion system capabilities are projected and their dramatic benefit for the helicopter noted. Author

N82-17205# Societe Turbomeca, Bordes (France).
DEVELOPMENT TEST PROGRAMS ADAPTED TO HELICOPTER ENGINES [PROGRAMMES D'ESSAIS DE DEVELOPMENT ADAPTES AUX MOTEURS D'HELICOPTERES]
J. Fresco *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The path to follow in a general program of engine development is shown with constraints of various kinds. There are regulatory requirements established by laws of navigability for civil aviation engines, and particular technical specifications for military aviation engines. Requirements of an operational order happen to be juxtaposed to precedents which are set by the different types of usages envisioned: flight profiles of various missions, and the environmental conditions likely to be encountered. This second factor is particularly important for a helicopter turbine because of the different utilizations and environmental conditions compared to a jet or turboprop engine. To address all these requirements, a test program must be built which, among others, takes into consideration this group of sometimes contradictory constraints in order to obtain certification and as well as to bring about development and operation without major risk. Specific tests for a helicopter turbine are examined with emphasis on the MAKILA program turbine which is on the AS-332 super PUMA. Transl. by A.R.H.

N82-17206# Army Aviation Research and Development Command, St. Louis, Mo.
AIRCRAFT TURBINE ENGINE DEVELOPMENT: CURRENT PRACTICES AND NEW PRIORITIES
Charles C. Crawford, Jr. and William J. Crawford, III (GE, Lynn, Mass.) *In* AGARD Helicopter Propulsion Systems Sep. 1981 8 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The T700 engine program was conducted during the 1970's and is representative of recent practices employed in the development of turboshaft engines for U.S. military application. The engine, which is in the 1,600 horsepower class, recently entered service in the twin engine U.S. Army UH-60A Black Hawk helicopter. The T700's field introduction follows an extensive program of technology demonstration, development, qualification and maturity. Requirements applied in the T700 program and associated benefits, challenges and penalties are surveyed. Suggested improvements for future programs are offered, and technology needs revealed during T700 development are identified. Post-qualification maturity testing, which was conducted to provide early exposure of high time failure modes, is described. Program features which are important for development costs payback are summarized. J.D.H.

N82-17207# Ministry of Defence, London (England). Directorate of Engine Technology.
FUTURE TECHNOLOGY AND REQUIREMENTS FOR HELICOPTER ENGINES
M. D. Paramour and M. J. Sapsard *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The design considerations and technology needed to meet possible future operational requirements are discussed and the relevant technological work being carried out or supported by the UK Ministry of Defence (Procurement Executive) is described. Also considered are the tradeoffs which become necessary in

seeking a suitable solution to conflicting needs. Finally the sizes of engines required to meet likely aircraft applications are examined. J.D.H.

N82-17208# Rolls-Royce Ltd., Leavesden (England).
MECHANICAL ADVANCES IN THE DESIGN OF SMALL TURBOSHAFT ENGINES
J. Dominy and K. J. Hart *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Mechanical components have a significant influence on the efficiency of a small gas turbine engine. Some of the performance losses associated with the design of the power transmission and internal air system are defined and discussed. Improvements in engine efficiency must be considered in conjunction with cost, reliability and size or weight. Many of the problems considered are applicable to gas turbines in general but become acute in small engines due to the adverse effects of scale on many components design parameters. To meet the increasing demand for more efficient powerplants the mechanical research engineer must improve the analysis of mechanical component behavior to produce optimized engine designs. Author

N82-17209# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
ADVANCED COMPONENT DEVELOPMENT DESIGN BASIS FOR NEXT GENERATION MEDIUM POWER HELICOPTER ENGINES
Jean Hourouziadis and Horst B. Kreiner *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Assuming an optimized thermodynamic cycle, engine components requiring intensive research and development efforts to produce a mature and reliable production engine are identified. Aerodynamic and structural data from rig and demonstrator test programs are presented. J.D.H.

N82-17210# Societe Turbomeca, Bordes (France).
THE INFLUENCE OF NEW TURBINE TECHNOLOGIES ON THEIR COMPONENTS [INFLUENCE DES NOUVELLES TECHNOLOGIES DES TURBINES SUR LEURS COMPOSANTS]
M. Giraud and H. Loustalet *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p In FRENCH (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The interdependence of the turbine engine with that of its components is considered as well as the objectives for developing future helicopter engines with average power. The classic design of an engine is used to show that a new architecture is required in order to reduce costs and increase reliability. The engine architecture has a strong impact on the technology and performance of its components and this places imposes on the designer new technologies for construction. High pressure turbines, reverse flow combustion chambers, and axial and centrifugal compressors are discussed. Transl. by A.R.H.

N82-17211# Avco Lycoming Div., Stratford, Conn. Preliminary Design and Advanced Programs.
AERODYNAMIC COMPONENTS FOR SMALL TURBOSHAFT ENGINES
J. W. Schrader and W. F. Schneider *In* AGARD Helicopter Propulsion Systems Sep. 1981 15 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Future developments of advanced helicopter engines are projected from an aerothermodynamic viewpoint. Cycles for engines aiming at lower specific fuel consumption, improved power lapse rates, and implementation of contingency ratings are discussed. These cycles include nonregenerative and regenerative cycles. Design trends are presented for the major engine aerodynamic components. Author

N82-17212# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
REGENERATIVE HELICOPTER ENGINES: ADVANCES IN PERFORMANCE AND EXPECTED DEVELOPMENT PROBLEMS
H. Grieb and W. Klussmann *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p ref Sponsored by Ministry of Defence of the Federal Republic of Germany (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

On the basis of modern engine component technology, including and emphasizing recent progress in high temperature heat exchanger technology, a conventional and a regenerative helicopter engine in the 900 kW power class are compared in design, performance and life cycle costs. The comparison shows that the installation properties of the two engines are roughly the same. The variable power turbine, being an indispensable part of a regenerative engine, leads to an extremely favorable transient behaviour with a moderate influence of severe cyclic loading on hot-part lifetime. No significant difference exists in infrared (IR) emission at part load, due to the design of the IR suppressor for the same exhaust temperature at maximum power. The life-cycle costs of a future fleet of attack helicopters equipped with regenerative engines can be lower than with conventional engines. J.D.H.

N82-17213# Westland Helicopters Ltd., Hayes (England).
LUBRICATION BREAKDOWN BETWEEN GEAR TEETH
B. A. Shotter *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Damage to gear teeth attributable to lubrication failure is an important failure mode. Detailed observations of the early stages of breakdown suggest that one may not be dealing with a single process: hence great care is necessary when drawing conclusions from observing a damaged pair of gears. A study of a number of these critical areas and discussion about others highlights the complexity of the problem. J.D.H.

N82-17214# Sikorsky Aircraft, Stratford, Conn.
ADVANCED TRANSMISSION COMPONENT DEVELOPMENT
Kenneth M. Rosen and Harold K. Frint *In* AGARD Helicopter Propulsion Systems Sep. 1981 17 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

Design innovations in helicopter gearbox development which permit high temperature operation at increased speeds without degrading strength or weight goals are discussed. One avenue of investigation, which shows promising strength or weight advantages, is high contact ratio gearing. The means taken to obtain a high contact ratio tends to produce an inherently weaker tooth and reliance must be placed on the multiple load-sharing feature of this design to achieve an advantage over low contact ratio gears. The appropriate consideration which must be addressed in the design stage to achieve optimum results is described. To provide high temperature capability, two UH-60A helicopter main transmission housings were fabricated from a stainless steel alloy to replace the conventional magnesium alloy casing. Design details and fabrication procedures are discussed. J.D.H.

N82-17215# Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate (Italy).
DESIGN CRITERIA OF THE A 129 HELICOPTER DRIVE SYSTEM
A. Garavaglia and G. Gattinoni *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The design philosophy of the Agusta-A 129 drive system which is developed to meet the modern requirements for a light helicopter in the antitank role with night and day fighting capability are discussed. The stringent requirements of system layout and achieving low weight, high life, maximum reliability, survivability and ballistic tolerance, through integrated system design, modular concepts, use of redundant system and dry run capability are outlined. E.A.K.

N82-17216# Service Techniques des Programmes Aeronautiques, Paris (France).

HELICOPTER DEVELOPMENT IN FRANCE [LE DEVELOPPEMENT DES HELICOPTERES EN FRANCE]

Daniel Berthault *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p In FRENCH (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

For the French helicopter industry, the last two decades correspond to a period of rapid growth. The national armed forces were supplied with significant quantities of good quality military equipment well adapted to their operational objectives. Considerable successes were met in the sale for exploration of military helicopters as well as other machines for civilian use, which were developed by taking account of market requirements. These were often classed in a very favorable manner in relation to the products of competitors. The essential characteristics of helicopter development in France during this period are traced. The lines of direction and the modality of action taken by various public services in this regard are analyzed. By defining future needs and the centers of action, perspectives for the future are outlined. Transl. by A.R.H.

N82-17217# Societe Nationale Industrielle Aerospatiale, Marignane (France.)

HELICOPTER AIR INLETS [ENTREES D'AIR D'HELICOPTERES]

A. Vuillet *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p refs In FRENCH (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

Because of engine architecture, air inlets on low and medium tonnage helicopters are located behind the rotor head, which makes feeding very difficult. This is particularly the case of the Ecureuil AS 350 and the Dauphin SA 365 which are equipped with new generation engines. These turbines have axial or annular intakes behind which the reductor is located beside either the blast pipe or the compressor. An indepth study of the air intakes from the project stage can permit their design with a minimum of unlucky repercussions on the power supplied by the engine, on the layer of the device, and on risks to pumping. For this reason, such a study is needed to reduce the delays and costs of operating such an intake in flight. Methods used at Aerospatial and results obtained on different devices are described. Transl. by A.R.H.

N82-17218# Westland Helicopters Ltd., Yeovil (England).

INTAKE DESIGN WITH PARTICULAR REFERENCE TO ICE PROTECTION AND PARTICLE SEPARATORS

P. A. H. Brammer and D. J. Rabone *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p ref (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

Total environmental protection for helicopter engines is discussed. The problems associated with different environments and intake systems which are used to give protection against particular environments are outlined. Three intake systems for evaluation in natural environments are proposed. E.A.K.

N82-17219# Societe Nationale Industrielle Aerospatiale, Marignane (France.)

THE DISTRESS REGIME ON THE BIMOTORED HELICOPTER [REGIME DE DETRESSE SUR HELICOPTERE BIMOTEUR]

J. P. Dedieu, M. Russier, and H. Dabbadie (Societe Turbomeca, Bordes, France) *In* AGARD Helicopter Propulsion Systems Sep. 1981 8 p refs In FRENCH (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

The trend toward bimotorization of civil and military helicopters raises the question of choice of power level for each engine in order to obtain acceptable performance in case of engine trouble, particularly at very low speed. The use of a distress regime to obtain a very high power level, for a short time, once in the life of an engine seems to be an interesting and promising approach. The relation between the levels of distress power and parameters related to the use of the helicopter, takeoff, mass, ceiling, and operating cost are considered for the case of a bimotored helicopter of average weight. The perspectives of homologization and the civil certification of such a regime on real technology engines are examined. Transl. by A.R.H.

N82-17220# Boeing Vertol Co., Philadelphia, Pa.

ENGINE/DRIVE/AIRFRAME COMPATIBILITY: A WAY OF LIFE

Carl Albrecht *In* AGARD Helicopter Propulsion Systems Sep. 1981 7 p refs (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

Engine/drive/airframe compatibility in development stages or during production of a new design were studied. Various compatibility encounters on Boeing Vertol helicopters, analyses, solutions as effected by current technology and engine/airframe manufacturer relationships and dynamic interface items are discussed. E.A.K.

N82-17221# Pisa Univ. (Italy). Ist. di Macchine.

PROBLEMS OF ENGINE RESPONSE DURING TRANSIENT MANEUVERS

Dino Dini *In* AGARD Helicopter Propulsion Systems Sep. 1981 14 p refs (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

Helicopter transition flight regime and extreme flight maneuvers which determine abrupt variation of the rotor drag torque during each revolution, and the corresponding effects on the engine are discussed. Repeated surging and the attendant transient torsional loads from the engine cause damage to the airframe components. The angular rotor acceleration, cyclically variable, influences the turbine gas producer rotor speed, introducing flow distortions and aeromechanical effects in all the engine. It is found that periodic and inertial blade loading has serious consequences to discs and shaft to which the blades are attached. The higher harmonics of the excitation over the discs provokes relevant flexural modes of forced vibration. Operation in transient rating with pitch increase or decrease has the greatest effect on the helicopter flight performance, owing to the power application capability and the fuel control system adaptability. It is shown that to obtain sufficient engine/airframe dynamic compatibility, aircraft developments have to incorporate technical advances, which include harmonic integrated controls for propulsion and flight systems. E.A.K.

N82-17222# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

HELICOPTER PROPULSIONS SYSTEMS. 1: VIBRATION PREVENTION SYSTEMS ON HELICOPTERS 2: PROBLEM OF NOISE IN THE CABIN

Gerard Genoux and Henri-James Marze *In* AGARD Helicopter Propulsion Systems Sep. 1981 19 p refs (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

Two different facets of the propulsion system/structure interaction are presented. The first interaction deals with low frequency vibration associated with the operation of the main rotor. These problems are either mechanical material fatigue and stressing or related to comfort. Implementation for reduction excitations and filtration of their transfer from the source to the cabin are described. The second interaction type is cabin noise associated with the operation of the reduction gear box. The vibratory energy generated at the gears propagates all the way to the passengers via the air and the structure. Cutting the intensity of transmission noise sources, the energy transfer between such sources and the structure and the energy radiation from the structure to the passengers is discussed. E.A.K.

N82-17223# Rolls-Royce Ltd., Leavesden (England).

AN ALTERNATIVE APPROACH TO ENGINEERING STRUCTURES USING MONITORING SYSTEMS

D. Lewis *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p (For primary document see N82-17203 08-07)

Avail: NTIS HC A13/MF A01

The micro processor based engine monitoring system (EMS) which reevaluates the rating structure and presents limitations to the pilots is discussed. The EMS system allows the achievement of a better relationship between the demonstrated capability of the engine and the authorized release for in service use. This is a first step to be followed later by a change of the qualification test to a more representative form in which the EMS gives a

more tangible link between bench test and customer operation. This allows better use of the engine to be made for the short time/high power requirements giving a more efficient engine performance at cruise conditions. E.A.K.

N82-17224*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPONENT RESEARCH FOR FUTURE PROPULSION SYSTEMS
C. L. Walker (Army Propulsion Lab., Cleveland, Ohio), G. J. Weden (Army Propulsion Lab., Cleveland, Ohio), and J. Zuk *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01 CSCL 21E

The factors affecting the helicopter market for the past, present, and future are reviewed. Acquisition cost, mission reliability, life cycle cost and civil and military aspects are reviewed. The potential for advanced vehicle configurations with substantial improvements in energy efficiency, operating economics, and characteristics to satisfy the demands of the future market are identified. Advanced propulsion systems required to support these vehicle configurations and the component technology for the engine systems are discussed. The selection of components in areas of economics and efficiency is considered. E.A.K.

N82-17225# Ministry of Defence, Bonn (West Germany).
FUTURE REQUIREMENTS FOR HELICOPTER PROPULSION SYSTEMS
H.-G. Bree and G. Backmann *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p refs (For primary document see N82-17203 08-07)
Avail: NTIS HC A13/MF A01

The measurements for single or twin engine systems are discussed. The trend to more sophisticated engines is reviewed in the light of diminishing resources of materials and fuel. Expected future economic conditions make it mandatory to counteract the increase of life cycle cost experienced in most of today's military systems. Means to reduce LCC are discussed. E.A.K.

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-17226# National Aeronautical Establishment, Ottawa (Ontario). Flight Research Lab.
AN INVESTIGATION OF MULTI-AXIS ISOMETRIC SIDE-ARM CONTROLLERS IN A VARIABLE STABILITY HELICOPTER
M. Sinclair and M. Morgan Aug. 1981 25 p ref
(AD-A106759; NAE-LR-606; NRC-19629) HC A02/MF A01 CSCL 01/4

The test aircraft was the NAE Airborne Simulator, an extensively modified Bell Model 205A-1, and the evaluation flights encompassed a wide range of demanding tasks from hover maneuvering and transitions to cruising flight, to nap-of-the-earth flight and precision IFR tracking. The isometric control systems included several two-handed and one-handed configurations with force-pedals for directional control, and one fully-integrated system which provided full control of the helicopter with either hand. T.M.

N82-17227# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.
PARALLEL COMPUTATION FOR DEVELOPING NONLINEAR CONTROL PROCEDURES Final Report, 1 Sep. 1977 - 30 Sep. 1979
Howard Kaufman and Richard Travassos Jul. 1981 238 p refs
(Grant AF-AFOSR-3418-77; AF Proj. 2307)
(AD-A107914; AFWAL-TR-81-3016) Avail: NTIS HC A11/MF A01 CSCL 09/2

Efforts since 1 October 1978 have been concerned with the application of the developed parallel optimization procedures to the design of non-linear flight control systems. Consideration has been given to the advantages to be gained from the direct use of the non-linear equations of motion and to the potential for rapid on-line optimization in response to tracked parameter changes and/or changes in the mission objectives. To date, based upon the non-linear longitudinal equations for the F-8, it has been shown that parallel optimization procedures alone can reduce the time required for optimization by at least 30% and that the direct use of the nonlinear (rather than the linearized) equations of motion does indeed improve attitude control. A study of further incorporation of parallelism into the basic utility routines such as integration and matrix manipulation has shown that the convergence time for a representative optimal control computation can be reduced by a factor of 20. Thus, it was concluded that incorporation of parallel computers might indeed permit online control computation and/or adaptation. To this effect possible architectural structures for such computers have also been studied. GRA

N82-17091# British Aerospace Aircraft Group, Brough (England).
THE DEVELOPMENT OF ASYNCHRONOUS MULTIPROCESSOR CONCEPTS FOR FLIGHT CONTROL SYSTEM APPLICATIONS
S. M. Wright and J. G. Brown *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs Sponsored in part by RAE (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17093# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
CONTINUOUS RECONFIGURATION IN A MULTI-MICROPROCESSOR FLIGHT CONTROL SYSTEM
Scott L. Maher and Stanley J. Larimer *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17106*# SRI International Corp., Menlo Park, Calif. Computer Science Lab.
HIERARCHICAL SPECIFICATION OF THE SIFT FAULT TOLERANT FLIGHT CONTROL SYSTEM
P. M. Melliar-Smith and Richard L. Schwartz *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 15 p refs (For primary document see N82-17086 08-01)
(Contract NAS1-15428)
Avail: NTIS HC A18/MF A01 CSCL 01B

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-17228*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
SCALE-MODEL STUDIES FOR THE IMPROVEMENT OF FLOW PATTERNS OF A LOW-SPEED TUNNEL Final Report, 1 Mar. - 31 May 1981
P. Stephen Barna Jan. 1982 46 p refs
(Grant NsG-1563)
(NASA-CR-169413) Avail: NTIS HC A03/MF A01 CSCL 14B

Parameters affecting the performance of a scale model V/STOL wind tunnel were measured. These included: (1) static pressure variation around the closed tunnel circuit as affected by the application of various screens; (2) pressure rise and radial distribution of flow through the fan; (3) variation of screen parameters and screen location affecting the flow; and (4) effects of multiple screens on the velocity distribution in the fourth diffuser. In these tests the fan was driven through a long shaft

by an externally situated 11,190-W (15-HP) motor equipped to turn at 4 speeds. B.W.

N82-17229# Mitre Corp., McLean, Va.
SURVEY OF 101 US AIRPORTS FOR NEW MULTIPLE INSTRUMENT APPROACH CONCEPTS
L. C. Newman, T. N. Shimi, and W. J. Swedish Sep. 1981 85 p refs
(Contract DOT-FA01-81-C-10001)
(AD-A107812; MTR-81W234; FAA-EM-82-3) Avail: NTIS HC A05/MF A01 CSCL 01/5

Several new concepts for multiple instrument approaches have been proposed to improve capacity and reduce delays at U.S. airports. The concepts include: dependent parallel approaches at reduced runway spacing; independent parallel approaches at reduced runway spacing; converging approaches; and triple approaches. One of the runways involved may be a separate short runway for general aviation and commuter traffic. A survey of 101 top U.S. airports was performed to determine the potential for applying the concepts to the existing runways. Specific applications of each relevant concept are provided. Calculations were performed for the top 30 U.S. air carrier airports to determine the actual delay improvement which could be expected to result from application of the multiple-approach concepts. Additionally, some general results are obtained for the remaining 71 airports. Author (GRA)

N82-17230# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
MODEL SIZE AND HUMIDITY EFFECTS ON SELECTED CALIBRATION PARAMETERS FOR THE 16-FT TRANSONIC WIND TUNNEL AT AEDC Final Report, 1 Oct. 1978 - 31 Dec. 1980
Ernest J. Lucas AEDC Nov. 1981 50 p refs
(AD-A107728; AEDC-TR-81-17) Avail: NTIS HC A04/MF A01 CSCL 14/2

Analyses of wind tunnel wall surface pressure data and model force data from tests conducted in the Propulsion Wind Tunnel (16T) with 1/9- and 1/4-scale fighter models were conducted to determine the effect of model size, location, and attitude, and tunnel flow humidity and Reynolds number on the test section calibration. The tests were conducted at Mach numbers from 0.6 to 1.4 at Reynolds numbers from 1,800,000/ft to 4,800,000/ft, depending on model structural limits and Mach number. The model influence was localized and did not affect the set conditions of the flow entering the test section. The currently used Reynolds number calibration is valid within the uncertainty of the instrumentation installed in the Tunnel 16T system. Analysis of the data indicates that the test section dewpoint should be below the free-stream static temperature to prevent humidity effects on model force data. Author (GRA)

N82-17231# Oxford Univ. (England). Engineering Lab.
TUBING SYSTEMS FOR THE MEASUREMENT OF FLUCTUATING PRESSURES IN WIND ENGINEERING
Stephen J. Gumley 1981 266 p refs Sponsored in cooperation with Ministry of Agriculture, Fisheries and Food and a Rhodes Scholarship
(Contracts F3/2/219; SRC-GR/B/6442.0)
(OUEL-1370/81) Avail: NTIS HC A12/MF A01

The computer aided design of pneumatic tubing networks incorporated in systems for the measurement of fluctuating pressures, which satisfy the dual requirements of unity amplitude transfer function and linear phase transfer function between the pressure at the surface being tested and a remote pressure transducer, was analyzed. Single tube systems, using restrictors to damp resonant peaks, and pneumatic averaging systems, using manifolds and restrictors, were studied. Calibration of networks, calculation of settling time of pneumatic systems after transients, design of surface tappings, effects of bends in tubing, effects of nonsymmetry of averaging manifolds, and the higher frequency behavior of tubing systems were included in the analysis. Results confirm that such devices can be used to control acoustic resonances, while the computer program enables tube dimensions to be chosen for optimum performance. Experiments performed in a 4 m x 2 m low speed wind tunnel. Author (ESA)

N82-17232# European Space Agency, Paris (France).
A SIMPLE HYBRID VISUAL SIMULATION FOR RESEARCH FLIGHT SIMULATORS
Friedrich Erdmann and Eckhard Biertuempel Nov. 1981 46 p refs Transl. into ENGLISH of "Eine einfache hybride Sichtsimulation fuer Forschungsflugsimulatoren" Rept. DFVLR-Mitt-80-13 Brunswick, Jul. 1980
(ESA-TT-690; DFVLR-Mitt-80-13) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 14,40

The basic theory of the system is described together with its realization with general purpose computers (digital-analog). The images generated consist of contour lines of the object. A contour line brightness control (depth screwing) is employed to produce a stereoscopic effect. The applicability of the method is demonstrated using runway, target and horizon symbols and combinations of these symbols. Different scenarios can be simulated in this way. Author (ESA)

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

N82-17233*# KMS Fusion, Inc., Ann Arbor, Mich. Dept. of Materials Sciences.
GLASS SHELL MANUFACTURING IN SPACE Final Report, Dec. 1978 - Dec. 1981
Raymond L. Downs, Matthias A. Ebner, and Robert L. Nolen, Jr. 21 Dec. 1981 104 p refs
(Contract NAS8-33103)
(NASA-CR-161972) Avail: NTIS HC A06/MF A01 CSCL 22A

Highly-uniform, hollow glass spheres (shells), which are used for inertial confinement fusion targets, were formed from metal-organic gel powder feedstock in a vertical furnace. As a result of the rapid pyrolysis caused by the furnace, the gel is transformed to a shell in five distinct stages: (a) surface closure of the porous gel; (b) generation of a closed-cell foam structure in the gel; (c) spheridization of the gel and further expansion of the foam; (d) coalescence of the closed-cell foam to a single-void shell; and (e) fining of the glass shell. The heat transfer from the furnace to the falling gel particle was modeled to determine the effective heating rate of the gel. The model predicts the temperature history for a particle as a function of mass, dimensions, specific heat, and absorptance as well as furnace temperature profile and thermal conductivity of the furnace gas. A model was developed that predicts the gravity-induced degradation of shell concentricity in falling molten shells as a function of shell characteristics and time. T.M.

N82-17234# European Space Operations Center, Darmstadt (West Germany). Operations Dept.
METEOSAT-2: TO/NSO PHASE OPERATIONS
Paris ESA Oct. 1981 71 p
Avail: NTIS HC A04/MF A01

The orbital operations in the METEOSAT-2 satellite being placed on planned geostationary position are reported. The activities necessary to perform commissioning of the METEOSAT-2 satellite are also described. On 28 July 1981, the first visible image was received from METEOSAT-2. J.M.S.

N82-17235# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE, NO. 14
22 Dec. 1981 79 p Transl. into ENGLISH from various Russian articles
(JPRS-79711) Avail: NTIS HC A05/MF A01

Soviet-French and Soviet-Bulgarian cooperative space efforts are discussed. Summations of space surveys to obtain geophysical and astrophysical data, specifically ionospheric and magnetospheric observations, are reported. The status of completed biomedical programs is summarized. Descriptions of and specifications for space antennas and gamma-ray instrumentation, utilized and proposed, are given. Utilization of Earth-Moon libration points for future explorations and observations is also discussed. For individual titles, see N82-17236 through N82-17242.

N82-17236# Joint Publications Research Service, Arlington, Va.

COMMENTARY ON SOVIET-FRENCH AUREOLE-3 SATELLITE

B. Konovalov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 1-3 Transl. into ENGLISH from Izv. (Moscow), 24 Sep. 1981 p 3 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

The 'Aureole-3' satellite developed by Soviet and French specialists, designed to study processes of energy transfer from Sun to Earth and investigate interrelationships of phenomena in the magnetosphere and ionosphere of our planet is discussed. The satellite's elliptical orbit from from 400 to 2000 kilometers high observes Earth's geoactive polar 'caps'. It was developed on the basis of the Soviet AUOS (automatic universal orbital station) series of satellites. It carries instruments, half Soviet half French, including those which register magnetic and electrical fields, detect and measure fluxes of low, medium and high energy particles in near-Earth space and measure fluxes of energy in the X-ray, ultraviolet, visible and near infrared ranges. The instruments will obtain data characterizing the state of matter at every point on the satellite's orbit. An on-board microcomputer (French) collects information from sensors, does preliminary processing, and distributes it in digital form. The value of the project and USSR-French cooperation in the study of space is also discussed. M.D.K.

N82-17237# Joint Publications Research Service, Arlington, Va.

COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE c15

Kirill Serafimov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 4-6 Transl. into ENGLISH from Izv. (Moscow), 12 Aug. 1981 p 5 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

A Bulgaria-Soviet satellite 'Intercosmo-Bulgaria 1300', designed to obtain data on the interaction between processes taking place in the magnetosphere and ionosphere is discussed. The mechanism whereby solar disturbances are transmitted to the Earth, and investigations of near-Earth plasma were studied. Systems for energy supply, stabilization, orientation, telemetry and telecommunication were designed and incorporated. The satellite's complex of instrumentation and equipment was divided into four groups: (1) systems and instruments for studying electrons and ions, determining their concentration, temperature, and distribution, and for detecting flows of ionospheric plasma; (2) a system for determining permanent and varying electric fields and a magnetometer; (3) an electro-photometer and a device for detecting and recording ultraviolet radiation; and (4) the angular laser reflector. M.D.K.

N82-17238# Joint Publications Research Service, Arlington, Va.

FURTHER COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE c15

In its USSR Rept.: Space No. 14 (JPRS-79711) 22 Dec. 1981 p 7-8 Transl. into ENGLISH from Kommunist (Yerevan, USSR), 13 Sep. 1981 p 2 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

'Intercosmos-Bulgaria 1300', the second satellite to carry Bulgarian geophysical instruments, was designed to provide information about physical phenomena occurring in near-Earth space. Electron-ion processes which exert an energetic effect on the lower layers of the atmosphere and influence meteorological conditions were of concern. Study of convection movements of ionospheric plasma and their relation to phenomena in other zones of the Earth's magnetosphere and in planetary space, investigations of turbulence phenomena in the near-Earth plasma, detection and study of inhomogeneities in the ionospheric plasma and of dynamic links between the ionosphere and the magnetosphere and measurements during heightened solar activity were made. Total electromagnetic compatibility of all of the scientific satellite apparatus and high experiment fidelity was accomplished. Soviet specialists devised a technical solution by developing a system of multiple-joint boom devices so that instruments could be positioned up to 5 meters away from the body of the satellite. Special coatings were developed and used for the body, the instruments, and solar batteries. The problem of heat elimination from instruments operating in open space was also solved. M.D.K.

N82-17239# Joint Publications Research Service, Arlington, Va.

STATUS OF SPACE BIOMEDICAL PROGRAMS c52

Avadalik Ignatyevich Burnazyan *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 29-33 Transl. into ENGLISH from Pravda (Moscow), 15 Jun. 1981 p 3 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

Four specialized biological satellites in the Cosmos series conducted research to study the mechanisms of the effect of weightlessness, the combined effect of weightlessness and ionizing radiation, and the biological effect of artificial gravity on living systems. Devices developed included: a centrifuge for the creation of artificial gravity, an irradiator, instruments for rowing and fixing plant organisms. The cardiovascular system as studied during the so-called period of acute adaptation to weightlessness (the first 7 days of a flight). Special features of central and peripheral blood circulation and blood circulation in the brain were studied. A ballistic cardiography method judged the contractive function of the evaluated dynamics of blood flow, and detected functional disruptions in the cardiovascular system. A densiotography method was also used. An 'Oxygen' physiological experiment was performed utilizing a portable 'Oxymeter' instrument to determine oxygen pressure level changes and its consumption by body tissues. Radiation safety tests were also conducted using thermoluminescent dosimeters. Results of these tests are given. A center for processing of the data and hygienic and biophysical information that serves as a consultative-prognostic group is also described. M.D.K.

N82-17240# Joint Publications Research Service, Arlington, Va.

INSTITUTE DIRECTOR DISCUSSES KRT-10 AND OTHER SPACE ANTENNAS c32

I. Zagura *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 38-41 Transl. into ENGLISH from Stroitelnaya Gazeta (Moscow), 12 Apr. 1981 p 3 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

The KRT-10 radiotelescope space antenna is described. It has a 10 meter umbrella, collapsible support radiators, four megaphones for the 12 centimeter band and a spiral for the 72 centimeter band attached to its body, high frequency radiation meter amplifiers, and a heat regulation system located in the hermetically sealed compartment. The antenna mirror has a reflective surface made from a specially knitted grid bed, woven from 50 micrometer thick metallic fibers. Onboard astrophysical studies using the antenna were conducted for the development of radioastronomical methods in space in two modes: circular rotation of the craft around a transverse axis for mapping of the Milky Way and constant orientation of the craft for observation of a pulsar, together with a 70 meter radiotelescope in the Crimea. Geophysical studies produced high resolution in measurements from space of the radio temperature brightness of the Earth and the world's oceans. Evaluations were conducted of the actual resolution of the antenna and data were taken on the quality of its opening. Signal reception capability was found dependent on the 'mirror' surface. Antennas of large ground radiotelescopes with diameters of approximately 100 meters are being constructed and design of folding antennas with diameters of 30 and 10 meters using the same principle as the 'KRT-10' is being implemented. M.D.K.

N82-17241# Joint Publications Research Service, Arlington, Va.

GAMMA-RAY INSTRUMENTATION AND ITS USES IN SPACE c93

V. G. Kirillov-Ugryumov, R. Z. Sagdeyev, and Yu. P. Semenov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 42-50 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 4, Jul. - Aug. 1981 p 4-8 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

Studies to examine astrophysical objects in various ranges of the electromagnetic spectrum using gamma ray instrumentation are described. Particular features of gamma-ray telescopes and orbital space observatories are discussed. Structural design criteria and specifics of instrumentation are described in detail for both American and U.S.S.R. programs. Equipment diagrams, specifically for gamma-ray telescopes spark chambers and scintillation counters are presented. Similar diagrams and descriptions are given for gamma-ray telescopes for soft gamma radiation and for medium-energy telescopes. M.D.K.

N82-17242# Joint Publications Research Service, Arlington, Va.

ADVANTAGES OF SPACE STATIONS AT THE EARTH-MOON LIBRATION POINTS

A. Brykov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 51-54 Transl. into ENGLISH from Aviats. Kosmonavt. (Moscow), no. 7, Jul. 1981 p 42-43 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

The utilization of space near the libration points in the Earth-Moon system for the effective solution of scientific and national economic problems is considered and discussed. The distinct advantages of locating space stations at these libration points is of specific concern. Control of spacecraft motion is simplified and the volume of required navigational information is reduced in these locations. Diagrams and descriptions of parameters in libration points in the Earth-Moon system are given. Utilization of these spaces, with long-base interferometers and other equipmentation, will provide opportunities for studying galactic nuclei, stars, intergalactic gases, and other basic research. The significance and application of Euler and Lagrange theoretical constructs in determining and using libration points is also discussed. The potential for using the libration points for creation of global communication systems is considered. M.D.K.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-17243*# Howard Univ., Washington, D. C. Dept. of Mechanical Engineering.

ON THE SHAPE AND ORIENTATION CONTROL OF AN ORBITING SHALLOW SPHERICAL SHELL STRUCTURE

P. M. Bainum and A. S. S. R. Reddy 9 Jul. 1982 11 p refs Proposed for presentation at the Joint IFAC/ESA Symp. on Automatic Control in Space, Noordwijkerhout, Netherlands, 5-9 Jul. 1982

(Grant NsG-1414)

(NASA-CR-168420) Avail: NTIS HC A02/MF A01 CSCL 22A

The dynamics of orbiting shallow flexible spherical shell structures under the influence of control actuators was studied. Control laws are developed to provide both attitude and shape control of the structure. The elastic modal frequencies for the fundamental and lower modes are closely grouped due to the effect of the shell curvature. The shell is gravity stabilized by a spring loaded dumbbell type damper attached at its apex. Control laws are developed based on the pole clustering techniques. Savings in fuel consumption can be realized by using the hybrid shell dumbbell system together with point actuators. It is indicated that instability may result by not including the orbital and first order gravity gradient effects in the plant prior to control law design. E.A.K.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-17244# Minnesota Univ., Minneapolis.

THE CONSTRUCTION OF A NEUTRAL MOLECULAR BEAM FACILITY AND ITS APPLICATION TO MASS SPECTROMETERS CARRIED ON SPACE VEHICLES Ph.D. Thesis

John Otto Ballenthin 1981 149 p

Avail: Univ. Microfilms Order No. 8125932

The design and implementation of a beam system intended for the simulation of the motion of planetary probes is discussed. The beam system employed the technique of isentropic expansion of gas through a free jet. Beam velocites of up to 6.3 Km/sec were obtained raising the temperature of the gas behind the nozzle orifice to 2400 K and by 'seeding' a small percentage of the gas of interest into a light mass carrier gas, i.e., hydrogen. This molecular beam was used as a tool to investigate the response of open source mass spectrometers to neutral gas beams. A method of calibrating the response of open source mass spectrometers against an idealized closed source was demonstrated. Measurements of this calibration constant for mass spectrometers similar to those employed on several Earth satellites and on several planetary entry probes show that correction factors of up to 30% are required for some instruments. Dissert. Abstr.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-17245# Air Force Armament Lab., Eglin AFB, Fla.

OPTIMAL CONTROL AND ESTIMATION FOR STRAPDOWN SEEKER GUIDANCE OF TACTICAL MISSILES

P. L. Vergez and J. R. McClendon Feb. 1982 25 p refs Backup document for AIAA Synoptic scheduled for publication in Journal of Guidance, Control and Dynamics in May/Jun. 1982

Avail: NTIS HC A02/MF A01

Recent advances in seeker technology have increased the fields-of-view significantly, such that future missiles could have the seeker fixed to its body (eliminating the gimbals) with fields-of-view in excess of 90 degrees. These body-fixed (strap-down) seekers introduce large measurement errors caused by their optics and electronics. Conventional guidance and filtering techniques do not work well with strapdown seeker measurements. Recent dither adaptive approaches to generate inertial measurements from the body fixed measurements in order to use conventional guidance have failed to work in higher engagements. However, guidance and estimation algorithms derived from optical control theory can function well with strapdown seeker measurements in high g engagements, resulting in greatly improved missile performance. L.F.M.

N82-17246# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A RAPID ESTIMATION OF THE LIFETIME OF NEAR EARTH SATELLITES FOR MISSION ANALYSIS

Nellore S. Venkataraman and Kondapalli Rama Rao Jul. 1981 28 p refs Presented at the 33rd Ann. Meeting of the SBPC, Salvador, Brazil, 8-15 Jul. 1981

(INPE-2158-RPE/377) Avail: NTIS HC A03/MF A01

The prediction of the lifetime of satellites in mission planning, programming, and planning of onboard scientific experiments, and the design of satellite equipment like batteries is discussed. In the initial stages of mission planning, the lifetime estimates are required for various launch conditions. Lagrange's

orbit equations are used with the air drag as the chief perturbation force. It is shown that by making a proper choice of the exospheric temperature, the CIRA-1972 model gives very good results when compared with more detailed atmospheric description where the density is calculated as a function of the altitude, latitude and other geophysical parameters. The lifetime is calculated for several satellites assuming constant drag coefficient. E.A.K.

N82-17247# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
ECONOMY OF SMALL REUSABLE LEO SATELLITE PLATFORMS
Dietrich E. Koelle 1981 13 p Presented at 32nd Intern. Astronautical Federation, Rome, 6-12 Sep. 1981 Submitted for publication
(MBB-UR-498-81-O) Avail: NTIS HC A02/MF A01

A concept for future small Shuttle launched reusable platforms, considered as a means of cost reduction for LEO missions is described. The first platform of this type of spacecraft is SPAS-01 to be launched in 1982. Follow on concepts are presented for astronomy missions (ASTRO-PLATFORM) and space processing activities (SP-PLATFORM) which have quite different requirements. Further, a 'standard platform' is discussed which could be equipped with payload modules of different nature. The operational and management aspects of this new approach are considered. Author

N82-17248# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
APPLICATION TO MISSILE DYNAMICS
C. P. Schneider 1980 16 p refs
(MBB-UA-553-80-O; AGARD-LS-18-1) Avail: NTIS HC A02/MF A01

In theoretical dynamics, missile motion is described in six degrees of freedom. The corresponding system of equations of motion contains external forces lift, drag and side force besides motor thrust and gravity, and as external moments the moments of pitch, yaw and roll. Forces and moments - which are dependent on flight conditions such as angles of attack, yaw, and roll, flight speed, acceleration and the angular velocities of pitch, yaw and roll - may be given as partial derivatives of these variables. The connection between aerodynamic modelling and the equation of motions is explained. Simple missile motions are chosen to explain steady and dynamic stability. The influence of steady and dynamic (quasisteady) derivatives is estimated. From literature, examples for the simulation of complicated flight motions caused by non-linear unsteady forces and moments are selected and shown in diagrams. Author

N82-17237# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE
Kirill Serafimov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 4-6 Transl. into ENGLISH from Izv. (Moscow), 12 Aug. 1981 p 5 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

N82-17238# Joint Publications Research Service, Arlington, Va.
FURTHER COMMENTARY ON INTERCOSMOS-BULGARIA 1300 SATELLITE
In its USSR Rept.: Space No. 14 (JPRS-79711) 22 Dec. 1981 p 7-8 Transl. into ENGLISH from Kommunist (Yerevan, USSR), 13 Sep. 1981 p 2 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

N82-17249# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Raumflugdynamik.
STUDY ON THE ACCOMMODATION POTENTIALS OF NADIR-ORIENTED PAYLOADS ON SPACE SHUTTLE
J. Puls, A. Drescher, H. vanderPiepen, and A. Rossbach Jul. 1981 63 p refs
(DFVLR-FB-81-27) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 11,70

Experiments of Earth observation were selected for a NADIR-oriented space shuttle mission. The application fields are Earth observation over land and water, cartography, and climate research. Accommodation of the different experiments on the Spacelab pallet was investigated. It is demonstrated that the pallet is unnecessary when an experiment support structure configurated by standard elements is used. Moreover the mission costs can be reduced by approximately 25 percent. J.M.S.

N82-17250# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
WIND TUNNEL TESTS OF THE SPACE SHUTTLE FOAM INSULATION WITH SIMULATED DEBONDED REGIONS Final Report
D. W. Stallings and A. S. Hartman AEDC Apr. 1981 36 p refs
(AF Proj. 921E)
(AD-A108079; AEDC-TSR-81-V13) Avail: NTIS HC A03/MF A01 CSCL 22/2

The tests were conducted to investigate the survivability of the external tank protection system with a hole in the insulation caused by area debonding and insulation tear-out. The material samples were tested using the wedge technique. The tests were run at a free-stream Mach No. 10 and a free stream total temperature of 1900 R. The wedge angle was varied to provide test conditions which were representatives of those expected during launch. Selected results are presented to illustrate the test techniques and typical data obtained. GRA

N82-17251# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
NASA/ROCKWELL INTERNATIONAL SPACE SHUTTLE ORBITER YAW HEATING TEST (OH-109) Final Report, 26 Oct. - 24 Nov. 1980
K. W. Nutt and L. A. Ticatch Jan. 1981 56 p refs Prepared in cooperation with AEDC
(AD-A107703; AEDC-TSR-81-V6) Avail: NTIS HC A04/MF A01 CSCL 20/4

Thin-skin thermocouple heat transfer tests were conducted on two 0.0175 scale and one 0.04 scale model of the space shuttle orbiter. In addition, a phase-change paint heat transfer test was conducted on a 0.0175 scale SILTS Pod tail of the orbiter. Oil flow data were also obtained on the orbiter's upper surface. The primary objective of the thin skin thermocouple entry was to obtain better identification of regions of peak heating on the upper surface of the orbiter with attention to the Orbiter Maneuvering System (OMS) pods. The objective of the phase-change paint entry was to establish the peak heating location on the orbiter SILTS tail configuration. Data were recorded at Mach 8 in the AEDC-VKF Hypersonic Wind Tunnel B at free stream Reynolds numbers ranging from 500,000 to 3,700,000. The model angle of attack ranged from 20 to 40 degrees with yaw angle varying from -2 to 2 degrees. Author (GRA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

N82-17252*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

QUEUEING ANALYSIS OF SYNCHRONOUS TIME DIVISION MULTIPLEXING WITH INDIVIDUAL SOURCE BUFFERING
L. Clare 1 Feb. 1982 68 p refs
(Contract NAS7-100)
(NASA-CR-168443; JPL-Pub-81-107) Avail: NTIS HC A04/MF A01 CSCL 17B

Synchronous time division multiplexing is analyzed. Packets of information arrive at the system as a compound Poisson process, and are transmitted only during individual periodic intervals. Packet arrivals are blocked (lost) if the system has a finite capacity and is congested. Using the theory of semiregenerative processes, the distribution of the number of packets in the system (system size) is found. This nonstationary distribution is used to determine the complete system behavior, including the delay distributions, the blocking probability, and the density of the system size at arrival instants. Numerical examples illustrate applications of the results given. S.L.

N82-17253*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SATELLITE APPLICATIONS TO ELECTRIC-UTILITY COMMUNICATIONS NEEDS
M. Horstein and R. Barnett 1 Dec. 1981 111 p refs
(Contract NAS7-100)
(NASA-CR-168430; JPL-Pub-81-104) Avail: NTIS HC A06/MF A01 CSCL 17B

Significant changes in the Nation's electric power systems are expected to result from the integration of new technology, possible during the next decade. Digital communications for monitor and control, exclusive of protective relaying, are expected to double or triple current traffic. A nationwide estimate of 13 Mb/s traffic is projected. Of this total, 8 Mb/s is attributed to the bulk-power system as it is now being operated (4 Mb/s). This traffic could be accommodated by current communications satellites using 3- to 4.5-m-diameter ground terminals costing $35,000 to $70,000 each. The remaining 5-Mb/s traffic is attributed to new technology concepts integrated into the distribution system. Such traffic is not compatible with current satellite technology because it requires small, low-cost ground terminals. Therefore, a high effective isotropic radiated power satellite, such as the one being planned by NASA for the Land Mobile Satellite Service, is required. A.R.H.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-17254*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TOTAL-DOSE RADIATION EFFECTS DATA FOR SEMICONDUCTOR DEVICES, VOLUME 2
William E. Price, Keith E. Martin, Donald K. Nichols, Michael K. Gauthier, and S. Frederick Brown 1 Dec. 1981 323 p
(Contract NAS7-100)
(NASA-CR-168428; JPL-Pub-81-66-Vol-2) Avail: NTIS HC A14/MF A01 CSCL 22B

Total ionizing dose radiation test data on integrated circuits are analyzed. Tests were performed with the electron accelerator (Dynamitron) that provides a steady state 2.5 MeV electron beam. Some radiation exposures were made with a Cobalt-60 gamma ray source. The results obtained with the Cobalt-60 source are considered an approximate measure of the radiation damage that would be incurred by an equivalent dose of electrons. E.A.K.

N82-17255*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONTROL SYSTEM DESIGN FOR THE LARGE SPACE SYSTEMS TECHNOLOGY REFERENCE PLATFORM
Rance S. Edmunds 15 Jan. 1982 112 p refs
(Contract NAS7-100)
(NASA-CR-168426; JPL-Pub-81-77) Avail: NTIS HC A06/MF A01 CSCL 22B

Structural models and classical frequency domain control system designs were developed for the large space systems technology (LSST) reference platform which consists of a central bus structure, solar panels, and platform arms on which a variety of experiments may be mounted. It is shown that operation of multiple independently articulated payloads on a single platform presents major problems when subarc second pointing stability is required. Experiment compatibility will be an important operational consideration for systems of this type. A.R.H.

N82-17256*# Martin Marietta Aerospace, Denver, Colo.
ADVANCED SPACE SYSTEM ANALYSIS SOFTWARE. TECHNICAL, USER, AND PROGRAMMER GUIDE Final Report, Sep. 1980 - Sep. 1981
C. E. Farrell and H. F. Zimbelman Sep. 1981 168 p refs
(Contract NAS1-16447)
(NASA-CR-165798; MCR-81-1334) Avail: NTIS HC A08/MF A01 CSCL 22B

The LASS computer program provides a tool for interactive preliminary and conceptual design of LSS. Eight program modules were developed, including four automated model geometry generators, an associated mass properties module, an appendage synthesizer module, an rf analysis module, and an orbital transfer analysis module. The existing rigid body controls analysis module was modified to permit analysis of effects of solar pressure on orbital performance. A description of each module, user instructions, and programmer information are included. T.M.

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N82-17257 Institut d'Aeronomie Spatiale de Belgique, Brussels.
ROCKET-BORNE INSTRUMENTATION FOR THE MEASUREMENT OF ATOMIC OXYGEN BASED ON CHEMICAL RELEASE IN THE LOWER THERMOSPHERE
E. vanHemelrijk and E. vanRansbeek 1981 33 p refs Submitted for publication
(Contract NFWO-10.089)
(Aeronomica-Acta-A-231-1981) Avail: Issuing Activity

Rocket-borne instrumentation, which determines atomic oxygen density as a function of altitude, was tested. A technique where NO gas is ejected in the backward direction of the flight is outlined. A 6.8 g explosive charge punches a 40 mm hole in the gas bottles. At 80 to 105 km altitude 99% of the gas is ejected within 0.07 sec over a 60 m release interval, assuming rocket velocity = 100 m/sec. The initial Gaussian radius of the cloud is 60 to 70 m, satisfying the point release principle. Cloud altitudes, and wind speeds are derived from ground based photographs. Oxygen concentration is determined by analyzing the chemiluminescence of the point releases. Rocket flights confirm the usefulness of the system. Author (ESA)

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-17258*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AUTOMATED POWER SYSTEMS MANAGEMENT (APSM) Final Report
A. O. Bridgeforth 15 Nov. 1981 65 p refs
(Contract NAS7-100)
(NASA-CR-168423; JPL-Pub-81-106) Avail: NTIS HC A04/MF A01 CSCL 22B

A breadboard power system incorporating autonomous functions of monitoring, fault detection and recovery, command and control was developed, tested and evaluated to demonstrate technology feasibility. Autonomous functions including switching of redundant power processing elements, individual load fault removal, and battery charge/discharge control were implemented by means of a distributed microcomputer system within the power subsystem. Three local microcomputers provide the monitoring, control and command function interfaces between the central power subsystem microcomputer and the power sources, power processing and power distribution elements. The central microcomputer is the interface between the local microcomputers and the spacecraft central computer or ground test equipment.
Author

N82-17259*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A STUDY OF THE SELECTION OF MICROCOMPUTER ARCHITECTURES TO AUTOMATE PLANETARY SPACECRAFT POWER SYSTEMS
A. Nauda (Bucknell Univ.) 1 Jan. 1982 36 p refs
(Contract NAS7-100)
(NASA-CR-168412; JPL-Pub-82-1) Avail: NTIS HC A03/MF A01 CSCL 22B

Performance and reliability models of alternate microcomputer architectures as a methodology for optimizing system design were examined. A methodology for selecting an optimum microcomputer architecture for autonomous operation of planetary spacecraft power systems was developed. Various microcomputer system architectures are analyzed to determine their application to spacecraft power systems. It is suggested that no standardization formula or common set of guidelines exists which provides an optimum configuration for a given set of specifications. E.A.K.

N82-17260# PDA Engineering, Santa Ana, Calif.
PATCHES-3. USER'S GUIDE FOR INVOLUTE COMPOSITES Final Report, Oct. 1978 - Jan. 1981
E. L. Stanton and T. E. Kipp Edwards AFB, Calif. AFRPL Aug. 1981 69 p refs
(Contract F04611-78-C-0082; AF Proj. 3059)
(AD-A107750; PDA-1437-00-02; AFRPL-TR-81-43) Avail: NTIS HC A04/MF A01 CSCL 21/8

A user's guide is provided for the nozzle analyst who needs to use the computer program PATCHES-III to model an involute component, but who does not want to become expert in all the modeling capabilities of the program. The analyst is expected to have a finite element background and should be familiar with how an involute is constructed. Models of test cylinders, involute billets and beam specimens excised from involute rings are described in detail. The bulk data input for these models are annotated and the output is illustrated with computer plots.
Author (GRA)

N82-17261# Marquardt Corp., Van Nuys, Calif.
SLD REACTION CONTROL AND PROPULSION SYSTEM. PRELIMINARY DESIGN STUDY Final Report
F. Coss 11 Nov. 1980 28 p
(Contract N00173-79--0342)
(AD-A107560; S-1525) Avail: NTIS HC A03/MF A01 CSCL 21/8

The Reaction Control and Propulsion System has been established on a preliminary basis. The overall system has been conceived using one TMC R-40B thruster, operating at 900 pounds t.. and ten TMC R-6C 5 pound thrust attitude control thrusters. The R-40B bipropellant thruster is a modified Space Shuttle Orbiter Attitude Control Engine (the R-40A). The R-40A has been modified only slightly with resized nozzle and chamber assembly optimized for the available space in the SLD. The R-6C bipropellant attitude control thrusters qualified for commercial and DoD spacecraft are packaged in two five thruster modules attached externally to the stage structure. Author (GRA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-17262 Princeton Univ., N. J.
ONE-ELECTRON MECHANISMS IN ORGANOMETALLIC CHEMISTRY Ph.D. Thesis
Gregory Maxwell Williams 1981 156 p
Avail: Univ. Microfilms Order No. 8127757

The oxidation of zirconocene bis(phosphine) by alkyl halides is considered. The oxidative adduct, Cp2ZrRX, as well as zirconocene dihalide, are formed by competitive processes which partition a Zr(II) monophosphine species. The dihalide is formed by successive halogen atom transfers resulting in two equivalents of aklyl radical in addition to the Zr(IV) product. The intermediacy of organic radicals was established by conventional product analysis, while EPR spectroscopy was used to chracterize the Zr(III) intermediates. Attempts to activate carbon-carbon bond-forming reactions or organonickel(II) complexes are described. The reaction between Cr(acac)2 and methallylnickel bromide dimer in the presence of aryl halides was examined. The reduction with Cr(II) appears to produce a highly reactive reduced nickel species which can be trapped by aryl halide. The formation of methallyl benzene competes with aggregation of the reduced nickel complex. Dissert. Abstr.

N82-17263*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE OF PTFE-LINED COMPOSITE JOURNAL BEARINGS
Harold E. Sliney and Frank J. Williams (North American Aviation, Inc., Los Angeles) 1982 18 p refs Presented at Ann. Meeting of the Am. Soc. of Lubrication Engr., Cincinnati, 10-13 May 1982
(NASA-TM-82779; E-1110) Avail: NTIS HC A02/MF A01 CSCL 13I

Plain cylindrical journal bearings consisting of aramid fiber reinforced epoxy outer shells and glass fiber reinforced PTFE lubricating liners were evaluated. All materials in these bearings are electrically nonconductive; thus eliminating the problem of galvanic corrosion sometimes encountered with metal bearings installed in dissimilar metal mountings. Friction and wear characteristics were determined for loads, temperatures, and oscillating conditions that are typical of current airframe bearing applications. Friction and wear characteristics were found to be compatible with most airframe bearing requirements from -23 C to 121 C. Contamination with MIL H-5606 hydraulic fluid increased wear of the PTFE liners at 121 C, but did not affect the structural integrity of the aramid/epoxy composite. Author

N82-17264# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
THE REPRESENTATION OF IMAGE TEXTURE
Michael Dennis Riley Sep. 1981 70 p refs
(Contract N00014-80-C-0505; Grant NSF MCS-79-23110)
(AD-A107636; AI-TR-649) Avail: NTIS HC A04/MF A01 CSCL 20/11

This thesis explores how to represent image texture in order to obtain information about the geometry and structure of surfaces, with particular emphasis on locating surface discontinuities. Theoretical and psychophysical results lead to the following conclusions for the representation of image texture: (1) A texture edge primitive is needed to identify texture change contours, which are formed by an abrupt change in the 2-D organization of similar items in an image. The texture edge can be used for locating discontinuities in surface structure and surface geometry and for establishing motion correspondence; (2) Abrupt changes in attributes that vary with changing surface geometry -- orientation, density, length, and width -- should be used to identify discontinuities in surface geometry and surface structure; (3) Texture tokens are needed to separate the effects of different

physical processes operating on a surface. They represent the local structure of the image texture. Their spatial variation can be used in the detection of texture discontinuities and texture gradients, and their temporal variation may be used for establishing motion correspondence. What precisely constitutes the texture tokens is unknown; it appears, however, that the intensity changes alone will not suffice, but local groupings of them may; and (4) The above primitives need to be assigned rapidly over a large range in an image. Author (GRA)

N82-17265# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
ORGANIC GRAINS AND THE SPECTRUM OF THE GALATIC CENTRE SOURCE IRS 7
D. T. Wickramasinghe, F. Hoyle, and N. C. Wickramasinghe May 1980 11 p refs Submitted for publication Prepared in cooperation with Royal Observatory, Edinburgh
(Preprint-58) Avail: NTIS HC A02/MF A01

A dry polysaccharide model for interstellar grains is proposed based on absorption in IRS 7. The excess optical depth of absorbing material in the line of sight to IRS 7, estimated from observational data by fitting a reddened 3500 K black body continum at 3.6 microns, was compared with the mass absorption coefficient for dry cellulose, estimated from laboratory data. Results show good agreement. Author (ESA)

24 COMPOSITE MATERIALS

Includes laminates.

N82-17266*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Materials Engineering.
CONTROL OF INTERFACE REACTIONS IN SIC/TI COMPOSITES Final Progress Report, Nov. 1977 - Jun. 1981
C. R. Houska and V. Rao Feb. 1982 61 p refs
(Grant NsG-1470)
(NASA-CR-168416) Avail: NTIS HC A04/MF A01 CSCL 11D

The reaction between a 0.5 to 1.0 Al film and a thick Ti substrate to form TiAl3 occurs very rapidly on heating to 635 C and causes the Al to be confined to the surface region. After heating to 900 C Ti3Al is formed with little release of Al into alpha Ti. Further annealing at 900 C eventually causes the Ti3Al phase to decompose and a substantial amount of Al is released into alpha Ti. The interdiffusion coefficient for Al in alpha Ti at 900 C increases by less than one order of magnitude as Al is varied from 0 to 20 at %. These data were obtained from the (101) X-ray diffraction intensity band using polycrystalline samples. Improvements in the analysis of X-ray diffraction data for the determination of composition profiles are discussed. S.L.

N82-17267*# North Carolina State Univ., Raleigh.
EFFECTS OF HIGH ENERGY RADIATION ON THE MECHANICAL PROPERTIES OF EPOXY/GRAPHITE FIBER COMPOSITES Status Report, 1 Jan. - 31 Dec. 1981
R. E. Fornes and J. D. Memory 31 Dec. 1981 121 p refs
(Grant NsG-1562-S4)
(NASA-CR-168421) Avail: NTIS HC A06/MF A01 CSCL 11D

Studies on the effects of high energy radiation on graphite fiber reinforced composites are summarized. Studies of T300/5208 and C6000/PMR15 composites, T300 fibers and the resin system MY720/DDS (tetraglycidyl-4,4'-diaminodiphenyl methane cured with diaminodiphenyl sulfone) are included. Radiation dose levels up to 8000 Mrads were obtained with no deleterious effects on the breaking stress or modulus. The effects on the structure and morphology were investigated using mechanical tests, electron spin resonance, X-ray diffraction, and electron spectroscopy for chemical analysis (ESCA or X-ray photoelectron spectroscopy). Details of the experiments and results are given. Studies of the fracture surfaces of irradiated samples were studied with scanning electron microscopy; current results indicate no differences in the morphology of irradiated and control samples. M.D.K.

N82-17268# Royal Aircraft Establishment, Bedford (England).
THE STRUCTURAL FORMATION AND PHYSICAL BEHAVIOUR OF CROSS-LINKED EPOXY RESINS
M. Fisher, F. Lohse, and R. Schmid Apr. 1981 43 p refs Transl. into ENGLISH from Makromol. Chem. (Basle), no. 181, 1980 p 1251-1287
(RAE-LIB-Trans-2067; BR81270) Avail: NTIS HC A03/MF A01

Network structures and physical properties of products obtained either by crosslinking polyepoxides with polyphenols, and by dicyandiamide or by catalytic polymerization are discussed and compared with those obtained by amine or anhydride curing. The highest crosslinking density was achieved by the polymerization of epoxy compounds. Amine and phenol curing resulted in similarly structured networks with mobile aliphatic segments and comparatively low crosslinking densities. Impact resistance, increased as network density decreased, a maximum being achieved with a medium chain length of 25-35 atom intervals between crosslinking points. The mechanical stability of polymers is limited by the cohesive strength KF which corresponds to the maximum shear strength of bonds. The cohesive strength and fracture toughness have a dual relationship. The model discussed for cohesive strength explains the relationship between chemical structure and the physical behavior of an epoxy resin over a wide range of temperature. M.D.K.

N82-17269# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
FATIGUE BEHAVIOR OF FIBER-RESIN COMPOSITES
J. F. Mandell Apr. 1981 58 p refs Submitted for publication Sponsored by Goodrich (B. F.) Co., Lord Corp. and Dow Chemical Co.
(MIT-RR-R81-2) Avail: NTIS HC A04/MF A01

The process of fatigue breakdown in fiber composites usually involves the progressive accumulation of matrix/interface cracking, with an associated loss in residual strength and modulus. This may continue until the residual strength is reduced to the cyclic stress, resulting in failure. However, tensile fatigue failure in many glass dominated composites appears to be a fiber or strand property, independent of the matrix or interface. This is true both of cyclic and static fatigue, and the S-N properties also translate into resistance to crack initiation and propagation from notches in notch-sensitive cases. Exceptions to the fiber dominated behavior occur when a more severe fatigue mechanism operates, as with short fibers in very ductile matrices, or woven fabric reinforcement. The general characteristics of the fatigue of composites is reviewed with emphasis on recent developments in glass fiber dominated behavior. Author

N82-17270# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoffe-Forschung.
THE INFLUENCE OF NOTCH LENGTH AND LIGAMENT LENGTH ON THE TOUGHNESS OF BORON FIBER REINFORCED ALUMINUM Ph.D. Thesis - Tech. Hochschule, Aachen
Petrus W. M. Peters Jan. 1981 123 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-22) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 23.80

The applicability of linear elastic fracture mechanics (LEFM, material parameter: toughness K sub o, K sub max) and of the point-stress criterion (material parameter: characteristic length d sub o) was investigated on several B/Al laminates. On DEN-specimens the load at the beginning of crack extension and at specimen fracture was measured and in some cases the resulting plastic zone and notch (tip) opening displacement or specimen extension. From these experiments the influence of notch length and ligament length on the respective material parameter was determined. It was found that the investigated parameters are notch-length-dependent and below a critical ligament length ligament-length-dependent. The notch length dependency at larger notch lengths is probably caused by the extension of the plastic zone, which cannot be described by a stress intensity factor. Author

N82-17271# McDonnell Aircraft Co., St. Louis, Mo.
EFFECTS OF BEARING/BYPASS LOAD INTERACTION ON

LAMINATE STRENGTH Final Report, 15 Feb. - 15 Sep. 1981
Samuel P. Garbo Wright-Patterson AFB, Ohio AFWAL Sep. 1981 31 p ref
(Contract F33615-77-C-3140; AF Proj. 3114)
(AD-A108006; AFWAL-TR-81-3114) Avail: NTIS HC A03/MF A01 CSCL 13/5

The subject of this program was structural evaluation of mechanically fastened composite joints. An add-on contract effort was performed to further evaluate the effects of bearing/bypass interaction on laminate strength. The results of the add-on contract are the subject of this report. The work performed under the original contract indicated additional studies were needed to further verify bolted composite joint strength methodology. The objective of this add on effort was evaluation of bearing versus bypass load interactions on laminate strength. Three laminates from the family of 0 deg, + or - 45 deg, and 90 deg ply orientations were tested to failure under a range of tension bypass to bearing load ratios. Predictions of laminate strength were obtained using the Bolted Joint Stress Field Model (BJSFM) described in Volumes 1 and 3 of AFWAL-TR-81-3041. Failure behavior of laminates was documented using ultrasonic C-scan techniques, and failure zones about the fastener hole were correlated with predictions. This report documents test procedures, test data, and theory/test correlations. GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics*.

N82-17272 Florida State Univ., Tallahassee.
A STATIC SCREENED POTENTIAL METHOD FOR THE CALCULATION OF ELECTRONIC TRANSITION PROPERTIES OF AZABENZENES Ph.D. Thesis
Kurt Delmas Donaldson 1981 192 p
Avail: Univ. Microfilms Order No. 8125764

A method based on using the static screened potential within the combined formalism of Green function theory and density response theory was developed. This method is applied to the calculation of electronic transition properties of a series of azabenzenes. This method consists of three basic stages of calculation. The first consists of a Pariser-Parr-Pople calculation using the Mataga-Nishimoto approximation for the potential producing set of zero order molecular orbitals and energies which serve as input into the second state. The first step in this stage is calculation of the free propagator from which the dressed polarization propagator is obtained. Using this, the static screened potential is calculated in three different ways. The first based on free propagator, the other two based on two different dressed propagators calculated. Once these potentials are obtained, the entire process is then repeated until the static screened potentials become self-consistent and self-consistent potentials, molecular orbitals, energies, and generalized bond orders are obtained. These serve as input into the equations of stage 3 in which transition energies and oscillator strengths are calculated. Dissert. Abstr.

N82-17273 Michigan State Univ., East Lansing.
AN AUTOMATED REAGENT PREPARATION SYSTEM FOR FAST REACTION-RATE ANALYSES Ph.D. Thesis
Rytis Tomas Balciunas 1981 182 p
Avail: Univ. Microfilms Order No. 8126467

The design, operation, and evaluation of an automated system for fast reaction rate measurements that utilizes a microcomputer controlled reagent preparation device is described. The modular, stepper motor driven syringe based reagent preparation system features a dilution range of up to five orders of magnitude from a single stock solution, with 0.1% RSD or better. Reagents are prepared from up to three different stock solutions and a diluent. Reproducibility of the delivered stock solutions and of the dilution process is better than Class A glassware in all cases tested. The operational hardware and software descriptions are presented, with detailed circuitry and timing of the microcomputer operations. The results of several chemical complexation studies are presented as a demonstration of the precision and utility of the system. Dissert. Abstr.

N82-17274 North Carolina Univ. at Chapel Hill.
SOME ANALYTICAL ASPECTS OF FIELD DESORPTION MASS SPECTROMETRY Ph.D. Thesis
David Fuller Fraley 1981 341 p
Avail: Univ. Microfilms Order No. 8125575

Field desorption mass spectrometry (FDMS) is used for the analysis of thermally labile, nonvolatile compounds. Current trends in FDMS including ion formation, experimental methods involving emitter production and ion current recording are investigated. The FDMS behavior of the anticancer drug analogs of 2-(methoxystyryl)-quinolines is investigated. The FDMS method gave superior signal intensity, ease of analysis, and molecular weight information, but little structural information. Thirty protected amino acids and oligopeptides containing the most common synthetic protecting groups were analyzed by FDMS. Even cystine derivatives and peptides with as many as 6 labile protecting groups gave the molecular ion as the base peak. Various techniques to modify carbon FD emitter surfaces are studied. Modifications to reduce surface interaction met with limited success. Dissert. Abstr.

N82-17275 Michigan State Univ., East Lansing.
ZEEMAN BACKGROUND CORRECTION WITH AN ELECTROTHERMAL GRAPHITE BRAID ATOMIZER Ph.D. Thesis
James Thorburn Gano 1981 189 p
Avail: Univ. Microfilms Order No. 8126502

The characterization of an electrothermal atomic absorption spectrometer employing an analyte-shifted Zeeman background correction technique is described. The spectrometer utilizes a microcomputer for data acquisition and to control the heating levels of the graphite braid electrothermal atomizer. In this Zeeman background correction technique, a constant magnetic field is applied to the atomizer in a direction perpendicular to the incident hollow cathode light. The absorption-time profile of the hollow cathode light polarized parallel and perpendicular to the magnetic field is recorded and the difference in these absorptions is proportional to the atomic density. Transmittance vs. magnetic field strength studies were performed on several elements to determine the optimum conditions for analysis. The background correction capabilities of the spectrometer were also tested by analyzing cadmium in the presence of a NaCl matrix. Dissert. Abstr.

N82-17276 Washington Univ., Seattle.
IN SITU ANALYSIS OF THIN LAYER CHROMATOGRAPHY PLATES USING AN IMAGING DETECTOR Ph.D. Thesis
Mary Lucille Gianelli 1981 147 p
Avail: Univ. Microfilms Order No. 8126103

Thin layer chromatography (TLC) plates were imaged onto a SIT vidicon camera to obtain both normal two dimensional images and spectral images of components by emission and absorption. Fluorescent fingerprinting of components on thin layer plates was accomplished by imaging the spots on the entrance slit of a monochromator and removing the exit slit, preserving both the emission spectra and the retention profile of the components. Absorption spectra were obtained by scanning the plate over the wavelength region of interest while simultaneously storing the images. The data is in the form a two dimensional matrix (fluorescence), or a series of two dimensional matrices (absorption), allowing the use of complex mathematical analysis methods to obtain qualitative and quantitative information of the compounds. In the normal image modes of both fluorescence and absorption, the instrument was found to be reproducible to within a half percent. Dissert. Abstr.

N82-17277 Michigan State Univ., East Lansing.
FORMATION CONSTANT AND PHOTOLABELING OF GRAMICIDIN CHANNELS IN LIPID BILAYER MEMBRANES Ph.D. Thesis
Hsiao Yung Guh 1981 161 p
Avail: Univ. Microfilms Order No. 8126505

Gramicidin, a polypeptide of 15 alternating D and L amino acids, increases the cation permeability of biological membranes. Ion transport across the membrane is mediated by gramicidin via the pore mechanism and the gramicidin channel consists of two molecules. By use of the charge injection technique, the formation constants of gramicidin channels in lipid membranes are obtained as well as the partition coefficients of gramicidin between the bilayer and torus phases. Both of the parameters depend greatly on the membrane thickness. A correlation was discovered between the dimerization constant and partition coefficient between the membrane and torus regions. Although relaxation experiments were performed on the membranes, the resulting physical parameters represent the equilibrium values for the same parameters prior to the charge perturbation.
Dissert. Abstr.

N82-17278 Michigan Univ., Ann Arbor.
THE CHEMISTRY AND DETECTION OF NICKEL CARBONYL Ph.D. Thesis
David Alan Hikade 1981 210 p
Avail: Univ. Microfilms Order No. 8125127

Nickel carbonyl has important industrial applications. However, relatively low concentrations of gaseous nickel carbonyl can have devastating effects on man. The ability to analyze the presence of low levels of nickel carbonyl is important. Development of a chemiluminescent method for metal carbonyl analysis culminated in the portable instrument built for the present study. It contains a heated charcoal CO source and a thermal differentiator which can distinguish among the three known chemiluminescing species; Ni(CO)4, Fe(CO)5, and NO. With good sensitivity, selectivity, monitoring ability, portable qualities, and low operating cost, the detector proved able to analyze both iron and nickel carbonyl. A study of homogeneous oxidation of Ni(CO)4, resulted in determination of activation parameters for the unimolecular decay rate constant. The energy and entropy of activation for the reaction were determined to be 23.8 kcal/mole and + 12.4 eu, respectively. Other studies found the presence of one or both metal carbonyls in pressurized CO cylinders, a CO stream passed over Ni powder, cigarette smoke, and in the portable instrument's CO source. Field studies demonstrated potential for metal carbonyl formation under some industrial situations.
Dissert. Abstr.

N82-17279 Florida Univ., Gainesville.
A COMPARISON OF METHODS TO ENHANCE SENSITIVITY IN ANALYTICAL MOLECULAR LUMINESCENCE AND PHOTOACOUSTIC CONDENSED PHASE SPECTROMETRY Ph.D. Thesis
Arthur Robert Jurgensen 1981 217 p
Avail: Univ. Microfilms Order No. 8127437

The room temperature fluorescence analytical figures of merit for 60 polynuclear aromatic hydrocarbons (PAHs) are presented. The limits of detection for most of the compounds are below 50 ng/mL and the average % relative standard deviation is 1.4%. The fluorescence excitation and emission peak wavelengths are listed. The low temperature phosphorescence and fluorescence analytical figures of merit for 60 PAHs are presented. In addition, the low temperature phosphorescence heavy atom enhancements factors of several PAHs in heptane and in ethanol/water in the red region are presented. Iodoethane, dimethymercury, I(-), Ag(+), Tl(+), and Pb(2+) were used as heavy atom perturbers with iodoethane, dimethymercury and Ag(+) giving the largest enhancement factors. Low temperature phosphorescence and fluorescence for most of the compounds are below 100 ng/mL and the average % relative standard deviation is 6%. The phosphorescence and low temperature fluorescence peak wavelengths are listed. Dissert. Abstr.

N82-17280 Virginia Polytechnic Inst. and State Univ., Blacksburg.
MULTICOMPONENT CONTINUOUS FLOW KINETIC ANALYSIS Ph.D. Thesis
David John Hooley 1981 320 p
Avail: Univ. Microfilms Order No. 8126262

An instrumentation system for Multicomponent Continuous Flow Kinetic Analysis was designed and constructed. It is useful for performing dilutions, flow injection analysis and continuous flow kinetics with relative standard deviations of less than 10 percent. The flow controller was able to regulate the flow of a conducting liquid and the light emitting diode colorimeter was able to detect KMnO4 linearly at concentrations of 10 to 600 micro M. The reaction of KMnO4 with KI was employed as a single component continuous flow test reaction. The feasibility of using the instrument for multicomponent continuous flow kinetic analysis was demonstrated. The flowmeter and flow controller are potential alternatives to the relatively expensive pumps used for flow injection analysis. Evaluation of the instrument's operation in flow injection mode indicates that it is useful as a convenient continuous flow kinetic detector for flow injection analysis and for testing developments in flow injection theory.
Dissert. Abstr.

N82-17281 Northwestern Univ., Evanston, Ill.
RESONANCE RAMAN SPECTROELECTROCHEMISTRY OF THE TETRACYANOQUINODIMETHANE DIANION, PART 1. DOUBLE POTENTIAL STEP CHRONOCOULOMETRY STUDIES OF ABSORPTION ON A SILVER ELECTRODE, PART 2 Ph.D. Thesis
Joseph Michael Lakovits 1981 186 p
Avail: Univ. Microfilms Order No. 8124935

The resonance Raman spectrum of electrogenerated tetracyanoquinodimethane dianion and the frequency shifts which accompany its formation from the radial anion were measured. A reasonable, qualitative correlation between these shifts and the weighted bond order and the weighted bond length changes was obtained for all of the observed modes except one. This Raman data was used to determine that the TCNQ in the coordination complex (Co(acacen)(py)2)2 TCNQ is, in fact, TCNQ=. The utility of double potential step chronocoulometry (DPSCC) for measuring surface excesses of adsorbed electroactive species was used on the solid silver electrode. It was possible to measure the amount of adsorbed 4-acetylpyridine and to put an upper limit on the amount of adsorbed 4-cyanopyridine. By an extension of the standard DPSCC method to form composite DPSCC plots, the anion-induced adsorbtion of Cd(II) on a silver electrode from thiocyanate and from chloride media was measured.
Dissert. Abstr.

N82-17282 Minnesota Univ., Minneapolis.
SECONDARY ION MASS SPECTROMETRY OF CHEMICALLY BOUND ORGANOSILANE FILMS AND PLASMA POLYMERIZED VINYLFERROCENE FILMS ON CONDUCTIVE AND SEMICONDUCTIVE SUBSTRATES Ph.D. Thesis
Michael Roy Ross 1981 259 p
Avail: Univ. Microfilms Order No. 8126010

The use of secondary ion mass spectrometry (SIMS) as a means of mass analyzing simple chemically bound organic films was demonstrated. Ion fragments (fragmentation patterns) for the bound en-silane and Pr-silane films are very similar to those found for gas phase ionization of ethylene-diamine and propylamine. Ion fragments formed give a means of suggesting fragmentation mechanisms as well as possible structural information about the bound films. The use of SIMS in the analysis of more complex film structures was not as successful at assigning actual molecular ion fragments to observed ions present in the SIMS spectrum. Cationized fragments of Cu(II) containing en-silane films were not observed. Where the auger electron spectrometry (AES) technique does not differentiate ultrathin films from monolayer films, SIMS detection shows substantial differences in film thicknesses. Both the damage to the film and the scrambling of the substrate-film region affect the SIMS ion yields in different ways. Evidence that thin film thickness determinations can be achieved from films which sputter in a non-ideal fashion is provided. Dissert. Abstr.

N82-17283 Houston Univ., Tex.
MODELING CHEMICAL SYSTEMS TO IMPROVE ANALYTICAL RESPONSE Ph.D. Thesis
Bohdan Sachok 1980 215 p
Avail: Univ. Microfilms Order No. 8126942

Modeling, it is demonstrated, can be a significant aid to the understanding and improvement of analytical responses from chemical systems. Two different divalent electrodes, a liquid ion-exchange type and a solid matrix type, were studied to determine their sensitivities to monovalent sodium interference in the determination of calcium. The combined effects of two mobile phase factors were determined by fitting a mechanistic

model to experimental data obtained at nine factor combinations. The multifactor strategy is extended to the reversed phase liquid chromatographic separation of a nine-component mixture. Discussions of other response criteria, such as retention time and elution order, are also presented. Amplification of detector response by means of detector-sensitive ion-pairing reagents is shown to be feasible in reversed phase liquid chromatographic systems. Dissert. Abstr.

N82-17284 Michigan State Univ., East Lansing.
ELECTROCHEMICAL INVESTIGATION OF SOLVENT EFFECTS ON THE ELECTRODE KINETICS AND THERMODYNAMICS OF SOME TRANSITION-METAL REDOX COUPLES Ph.D. Thesis
Saeed Sahami 1981 218 p
Avail: Univ. Microfilms Order No. 8126549

Electrochemical methods were used in order to explore the influences of the solvent upon the electrode kinetics and thermodynamics of some transition metal redox couples. For the following redox couples: (1) couples containing aromatic ligands, (2) couples containing ammine and ethylenediamine ligands, (3) anionic redox couples, formal potential E sub f were evaluated using cyclic voltammetry as a function of temperature in eight solvents. The reaction entropies for each redox couple in each solvent were obtained from the temperature dependence of E sub f using a nonisothermal cell arrangement. The values of the reaction entropies for all redox couples investigated, it was found, are substantially larger in nonaqueous solvents compared with water. Normal pulse and d.c. polarography were employed to investigate the one-electron reduction kinetics in various solvents at mercury electrodes. Dissert. Abstr.

N82-17285 Illinois Univ. at Urbana-Champaign.
SINGLET-DELTA MOLECULAR OXYGEN AS A TOOL FOR SELECTIVE CHEMILUMINESCENT DETECTION IN CHROMATOGRAPHY Ph.D. Thesis
Brian Shoemaker 1981 146 p
Avail: Univ. Microfilms Order No. 8127689

Chemiluminescence induced by the single delta state of molecular oxygen has potential as a tool for selective detection in high performance liquid chromatography. Luminescence occurs in a three liquid confined spray aspirator cell. This unit displays dead volume behavior dependent on gas and liquid flow rates. The cell represents a straightforward add-on to any chromatography setup. Signal processing can occur by either digital or analog means, mounting the cell by the entrance slit to the polychromator of a diode array spectrometer permits accumulation of luminescence spectra. Results to date have demonstrated the unique selectivity, and potential practical utility, of detection by single oxygen induced luminescence in the spray cell. The current technique can provide information of interest in the environmental, medical, and textile fields. Gas phase single oxygen reactions should provide a new method for selective gas chromatography detection; other luminescence systems are available for use in the spray cell. Dissert. Abstr.

N82-17286 North Carolina Univ. at Chapel Hill.
CORRELATION AND INTERFEROMETRIC DATA ANALYSIS APPLIED TO GAS CHROMATOGRAPHY FOURIER TRANSFORM INFRARED SPECTROSCOPY Ph.D. Thesis
Richard Claburn Wieboldt 1981 140 p
Avail: Univ. Microfilms Order No. 8125636

Gas chromatography Fourier transform infrared spectroscopy provides the chemist with the ability to separate and identify, simultaneously, mixture components. Effective analysis of data generated requires algorithms that rapidly identify portions of data which contain useful information and provide assistance in identification. The development of such algorithms and their application to the analysis of shale oil mixtures is reported. The optical design for a gas chromatograph FTIR interface is described along with its limitations. A correlation technique which allows the FTIR to be used as a specific detector for the gas chromatograph is also discussed. The use of fast Fourier transform subroutines is described in detail as part of the method for generating the synthetic interferograms. With this approach, the key absorption features for nine functional groups were determined. Dissert. Abstr.

N82-17287 Illinois Univ. at Urbana-Champaign.
APPLICATIONS OF NUCLEAR QUADRUPOLE DOUBLE RESONANCE SPECTROSCOPY Ph.D. Thesis
Leslie Gordon Butler 1981 294 p
Avail: Univ. Microfilms Order No. 8127558

Nuclear quadrupole double resonance techniques have been developed to facilitate observation of NQR spectra of the light elements. A new instrument was constructed which employs the established technique of nuclear quadrupole double resonance by adiabatic demagnetization in the laboratory frame. NQR spectra in zero applied magnetic field can be obtained from 500 mg or less of polycrystalline material. NQR spectroscopy provides information about the electric field gradient about a quadrupolar nuclei and details of chemical bonding. D and 17O NQR spectra were obtained on a wide variety of inter- and intramolecular hydrogen bonds and electric field gradient parameters were interpreted by a theoretical analysis of the formaldehyde-water hydrogen bonding interaction. Large changes in the electric field gradient parameters were observed at the deuterium and oxygen sites. The first complete NQR spectrum for an S = 3 spin system, B, was obtained from a study of boric acid. Techniques developed were applied to the study of the 10B and 11B NQR of decaborane(14) and ortho-carborane. Dissert. Abstr.

N82-17288 Michigan State Univ., East Lansing.
EXCITED-STATE PHENOMENA ASSOCIATED WITH SOLVATION SITE HETEROGENEITY Ph.D. Thesis
Khader Ahmad Al-Hassan 1981 190 p
Avail: Univ. Microfilms Order No. 8126463

The role of microenvironmental heterogeneity in electronic spectra is examined by studying the effects of medium polarity, rigidity, temperature, concentration and excitation wavelength dependence of the spectra of pyridine merocyanine dye, 2-amino 7-nitrofluorene (ANF), 4,4'-amino nitro diphenyl (AND) and methyl- and tertbutyl-esters of 9-anthroic acid (9MA and 9TBA respectively). The absence of excitation wavelength dependence of the fluorescence at room temperature in fluid polar media is explained in terms of orientational and translational relaxations of various 'solute-solvent conformations' that occur prior to fluorescence. The fluctuations in the interaction of solutes with different solvation sites are dynamic in fluid media. Once the solution is made rigid (glass, polymer matrix, etc.) the dynamic character is lost. Dissert. Abstr.

N82-17289 Illinois Univ. at Urbana-Champaign.
HIGH PRESSURE NUCLEAR MAGNETIC RESONANCE STUDIES OF VISCOUS FLUIDS Ph.D. Thesis
Edward Rolf Arndt 1981 164 p
Avail: Univ. Microfilms Order No. 8127545

The technique of pulsed NMR is applied to the detailed study of molecular motions in a number of viscous liquids (eta > or approximately 1 poise). Pressure studies are performed in order to examine explicitly the effect of volume on the motional characteristics. Where appropriate, C-13 and D-2 NMR are employed to obtain exclusively reorientational information, and to observe specific portions of the molecule. The validity range of the common hydrodynamic relationships at high viscosity are determined. A foundation for the systematic investigation of high viscosity fluid dynamics is provided. Cumene, since it is the simplest of high viscosity, nonassociative liquids is studied. A number of experiments show that cumene displays rather remarkable properties, which are explained using models that coincidently are applied to glass transition phenomena. Dissert. Abstr.

N82-17290 Pennsylvania Univ., Philadelphia.
PICOSECOND STUDIES OF SOLVENT-SOLUTE INTERACTIONS Ph.D. Thesis
Leslie Ann DiVerdi 1981 158 p
Avail: Univ. Microfilms Order No. 8127015

Two types of solvent-solute interactions were studied with emphasis on measuring their dynamics. Using the solute ANF (2-amino, 7-nitrofluorene), the relaxation process caused by the interaction of the solute dipole and the solvent dielectric was investigated. Studies of the solute acridine were performed to demonstrate how hydrogen bond formation between solvent and solute can cause inversion of solute energy levels. A method for picosecond time resolution of fluorescence was developed.

Fluorescence decay times and radiative lifetimes were measured for acridine. For the hydrogen bonding solvents, the radiative lifetimes were constant while the florescence decay times varied with solvent hydrogen bonding strength and temperature. The radiative lifetimes of the non-hydrogen bonding solvents were seen to vary with solvent polarizability and polarity, while the decay times were temperature independent and varied little with solvent. Dissert. Abstr.

N82-17291 Columbia Univ., New York.
UNIMOLECULAR ISOMERIZATION DYNAMICS AND INSTABILITIES: RRKM THEORY Ph.D. Thesis
Nelson Hugo DeLeon 1981 194 p
Avail: Univ. Microfilms Order No. 8125271

A classical two degree of freedom Hamiltonian system capable of exhibiting an isomerization reaction was studied. An ensemble of trajectories, distributed microcanonically, are computed numerically. The application of a phenomenological rate equation to describe the reaction is considered. The prediction of the rate constant using statistical theories such as RRKM is described. The concepts of nonlinear dynamics are introduced in order to explain the observed results. Correlations between the critical energy and phenomenological behavior are introduced. Chirikov's overlapping resonance criterion for the theoretical prediction of the critical energy is investigated and interpreted into a phase space picture. The concept of the resonant torus in phase space is introduced. A reinterpretation of the overlapping resonance scheme is applied to the Ford-Walker Hamiltonian system. It is found to give an excellent prediction of the critical energy for small coupling constants. The reasons for failure of the scheme at large coupling constants are analyzed. Dissert. Abstr.

N82-17292 Virginia Polytechnic Inst. and State Univ., Blacksburg.
THE ELECTROCHEMICAL AND SPECTROPHOTOMETRIC DETERMINATION OF FREE AND COMBINED CHLORINE Ph.D. Thesis
Paul David Given 1981 125 p
Avail: Univ. Microfilms Order No. 8126258

The electrochemical reduction of hypochlorite and monochloramine at several electrodes was investigated by cyclic voltammetry, linear scan voltammetry, and differential pulse polarography. The electrochemical oxidation of N,N-diethyl-p-phenylenediamine (DPD) was investigated as a function of pH, scan rate, and electrode material. On the basis of the electrochemical studies, a modified amperometric titration for both free and combined chlorine was developed. Standard addition methods were shown to be possible. The indicator, bromothymol blue (BTB) was used to determine both free chlorine and monochloramine in mixtures by spectrophotometry. The method developed requires Bi as a catalyst for the determination of monochloramine in mixtures.
Dissert. Abstr.

N82-17293 Yale Univ., New Haven, Conn.
LASER SPECTROSCOPY OF MOLECULAR BEAMS Ph.D. Thesis
James Henry Glownia 1981 217 p
Avail: Univ. Microfilms Order No. 8125680

Multiphoton ionization spectroscopy and photofragment spectroscopy of molecular beams are used to elucidate excited molecular electronic state structure and dynamics. The apparatus and techniques developed to combine multiphoton ionization and supersonic-expansion beams is described. Also described are experimental methods involving mass spectroscopic and photoelectron energy analyses following the multiphoton ionization process. The multiphoton ionization spectrum of ammonia and sulfur dioxide are analyzed in detail. The three-photon static gas line strength theory for two laser polarizations is tested, and band contour simulation performed. Deviations from the theoretical predictions can be attributed to dynamic effects. Features due to transitions to eleven electronic states are assigned in the 5.7 to 9.3 eV energy range, where only five band systems were previously assigned. Spectra of sulfur dioxide are recorded using transient lensing detection in a cell and multiphoton ionization in both a cell and a nozzle beam. Ultraviolet and visible photodissociation of collision-free-tetrazine show asymmetric dynamics with production of one translationally cool and one translationally hot hydrogen cyanide molecule. Dissert. Abstr.

N82-17294 Minnesota Univ., Minneapolis.
VIBRATIONAL CIRCULAR DICHROISM STUDIES IN THE CARBON-HYDROGEN AND CARBON-DEUTERIUM STRETCHING REGIONS Ph.D. Thesis
Henry Acken Havel 1981 256 p
Avail: Univ. Microfilms Order No. 8125965

Vibrational circular dichroism (VCD) spectroscopy is implemented in experimental and theoretical investigations of vibrational optical activity in two series of compounds: optically active deuterated phenylethanes and sugars. Vibrational circular dichroism instrumentation and theoretical methods are discussed, in addition to structural and dynamical interpretations of the solution phase VCD spectra of these molecules. The phenylethanes, (+)-(S)-Ph-C(=)HD-X(X=CH3, CH2D, CD2H, CD3), are studied in their C-H and C-D stretching regions as first tests of a charge flow model for vibrational rotational strengths. A vibrational assignment in these two regions is accomplished by analyzing their infrared absorption, Raman scattering and VCD spectra; the latter is particularly useful in identifying Fermi resonant vibrational bands. Normal coordinate calculations are made by constructing an initial force field and adjusting it to fit the observed frequencies in the phenylethanes. Dissert. Abstr.

N82-17295 Yale Univ., New Haven, Conn.
ELECTRONIC ABSORPTION SPECTROSCOPY OF MOLECULAR CATIONS IN ARGON MATRICES Ph.D. Thesis
Anabela Cristina Puiu 1981 144 p
Avail: Univ. Microfilms Order No. 8125695

Absorption spectra of argon matrix isolated hexafluorobenzene, para-difluorobenzene, biphenyl, diphenyl acetylene and cis- and trans-stilbene positive ions are presented and interpreted. Negative results for benzene and monofluorobenzene cations are discussed, as well as some new spectral features that appear upon the vacuum uv irradiation of benzene-h6 and benzene-d6 trapped in solid argon. In the course of this work, several techniques of detecting weak optical absorptions were developed or adapted for the spectroscopic investigation of unstable species in inert gas matrices and data comparing them are presented. Different sample preparation methods are also described.
Dissert. Abstr.

N82-17296 Michigan State Univ., East Lansing.
THEORETICAL CALCULATIONS OF POWER-BROADENED MICROWAVE LINESHAPES Ph.D. Thesis
Keith L. Peterson 1981 223 p
Avail: Univ. Microfilms Order No. 8126542

The traditional method of analyzing high power microwave transitions is to assume the lineshape is a sum of Lorentzians--one for each m component pair connected by the microwave radiation. This assumption is tested by using extended Anderson Theory and infinite order energy sudden approximations to calculate relaxation cross sections. These cross sections appear in the power broadening term of an expression for high power line shapes which correctly takes into account the degeneracy of the rotational levels. The theoretical lineshape obtained with the relaxation coefficients is fit to a sum of Lorentzians using a computer program developed for fitting experimental lineshapes. The goodness of fit is a measure of the validity of the sum of Lorentzians approximation. The results for the J = 2 yields 1 transition in OCS and the (J,K) = (3,3) inversion transition of NH3 show that in both modified Anderson Theory and energy sudden approximations the value of T sub 1/T sub 2 obtained by fitting to a sum of Lorentzians is a good approximation to the calculated values of T sub 1/T sub 2. Dissert. Abstr.

N82-17297 Brandeis Univ., Waltham, Mass.
PHOTOPHYSICS AND PHOTOCHEMISTRY OF MOLECULAR GASES IRRADIATED BY MEGAWATT CO2 LASER RADIATION Ph.D. Thesis
Vladimir Starov 1981 218 p
Avail: Univ. Microfilms Order No. 8126897

Energy absorption measurements were carried out in ammonia and silicon tetrafluoride over a wide range of pressures, 0.4-250 Torr. Both gases were irradiated by a TEA CO2 laser at fluences 0.01-1 J/sq cm. Chemical reactions induced by the laser-excited sensitizers in mixtures SiF4 - cyclopropane (CP) and NH3 - cyclobutanone (CB) were characterized. A phenomenological kinetic model was developed for applications to

absorption and dissociation results obtained in the collisional regime. From the energy absorption data, it was found that the results can be fitted by an empirical law (generalized Beer's law) for all systems studied under similarity conditions. Using the proposed absorption law, variation in the slopes of the Grunwald-dever plots for the SiF4 CP system studied at 5-30 Torr is explained. Analysis of the high pressure sensitized systems also indicated that the data are consistent with a model where laser energy absorbed by the sensitizer is mostly thermalized.
Dissert. Abstr.

N82-17298 Defence Research Information Centre, [illegible]ington (England).
THE APPLICATION OF ELECTROCHEMICAL DETECTION IN HIGH PERFORMANCE LIQUID CHROMATOGRAPH (HPLC): SELECTIVE DETERMINATION OF READILY OXIDISABLE COMPOUNDS AT TRACE LEVEL
J. Frank Oct. 1981 30 p refs Transl. into ENGLISH from Chimia (West Germany), v. 35, 1981 p 24-31
(DRIC-T-6461; BR80786) Copyright. Avail: Issuing Activity

The electrochemical conversion of a substance at an electrode produces a faradic current which is recorded in a chromatogram as current strength in function of time. Chromatograms are given for compounds suited for oxidative detection at solid state electrodes as antioxidants, aromatic amines, catecholamines, estrogens, indoles, mercaptions, phenols, phenothiazines and vitamins, showing which compounds can be successfully detected at nano and picogram levels. The principle and selectivity of the detection, cell types, electrodes and practical aspects are described. Author (ESA)

N82-17299*# California Univ., Los Angeles.
ZERO-GRAVITY GROWTH OF A SODIUM CHLORIDE-LITHIUM FLUORIDE EUTECTIC MIXTURE Final Report
A. S. Yue, C. W. Yeh, and B. K. Yue [1982] 27 p refs
(Contract NAS8-30579)
(NASA-CR-161966) Avail: NTIS HC A03/MF A01 CSCL 07D

Continuous and discontinuous lithium fluoride fibers embedded in a sodium chloride matrix were produced in space and on Earth, respectively. The production of continuous fibers in a eutectic mixture was attributed to the absence of convective current in the liquid during solidification in space. Image transmission and optical transmittance measurements of transverse sections of the space-grown and Earth-grown ingots were made with a light microscope and a spectrometer. It was found that better optical properties were obtained from samples grown in space. This was attributed to a better alignment of lithium fluoride fibers along the growth direction. Author

N82-17300*# Squibb (E. R.) and Sons, Princeton, N.J.
DEVELOPMENT OF W-Ta GENERATOR Interim Report
Dec. 1981 14 p refs
(Contract NAS9-16225)
(NASA-CR-167477) Avail: NTIS HC A02/MF A01 CSCL 07D

This research program was used to further develop the existing W-Ta generator and to evaluate alternative adsorbents, preferably inorganic materials, as supports for the generator. During the first half year, combinations of non-complexing eluents and a variety of adsorbents, both inorganic and organic, were evaluated. Some of these adsorbents were synthetic, such as chelate resins that could be specific for tungsten. In the second half of the year, the stress was mainly on the use of complexing eluents because of the high affinity of hydrous oxides for tantalum, on the synthesis of chelate resins and on the use novel techniques (electrolytic) to solve the tantalum-adsorption problem. L.F.M.

N82-17301# Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.
COMPUTERIZED GAMMA SPECTRUM ANALYSIS WITH APPLICATION TO MULTICOMPONENT ACTIVATION DETECTORS Ph.D. Thesis
Markku Koskelo 1981 14 p refs
Avail: NTIS HC A02/MF A01

Computerized gamma spectrum analysis and multicomponent activation detectors are discussed. The optimization of the multicomponent activation detectors using methods from the gamma spectrum analysis program is studied. A method for the determination of goodness-of-fit in gamma spectroscopy is a study which checks that peak area fitting. It is more sensitive than the chi squared test. The SAMP080 code was developed. The basic ideas and equations used in the program are presented. Statistical methods show that the peak search algorithm and the peak fitting of the code are both precise and accurate. The considerations needed in developing the multicomponent activation detector concept are presented with emphasis on the material selection criteria and the general process of actually designing a feasible detector for reactor neutron spectroscopy. S.L.

N82-17302# Aerospace Corp., Los Angeles, Calif. Chemistry and Physics Lab.
MULTIPHOTON GAS PHASE SPECTROSCOPY Final Report
John E. Wessel 8 Jun. 1981 67 p refs Prepared for Univ. of Southern Calif., Los Angeles
(Grant AF-AFOSR-3438-77; AF Proj. 2302)
(AD-A107671; AFOSR-81-0749TR) Avail: NTIS HC A04/MF A01 CSCL 07/4

Multiphoton laser spectroscopy was investigated as a potential method to improve optical detection for large molecular species. Studies were conducted to establish the photophysics and spectroscopy relevant to molecular detection by multiphoton processes. Detection procedures were optimized on the basis of information derived from the spectroscopic investigations. Detection limits of less than 10 to the 5th power molecules/cubic centimeters were established for naphthalene, a representative aromatic species. This is a one-thousandfold improvement with respect to the most sensitive prior techniques. The new method was applied to gas chromatography, for which spectrally selective detection was demonstrated. In addition a new method of ultrahigh resolution two-wavelength multiphoton photoionization spectroscopy was proposed, and a preliminary demonstration was made for the iodine molecule. Author (GRA)

N82-17303*# Howard Univ., Washington, D. C. Laser Chemistry Div.
ENERGY PARTITIONING IN THE DISSOCIATION OF CYANOGEN AT 193nm
William M. Jackson and Joshua B. Halpern 19 Nov. 1981 25 p refs Submitted for publication
(Grant NSG-5017; Contract N00014-80-C-0305; Grants NSF CHE-78-05375; E-40-1-5056; NR Proj. 051-733)
NASA-CR-164809; AD-A107773; TR-7-ONR Avail: NTIS HC A02/MF A01 CSCL 07/5

The quantum state distributions of CN radicals produced in the photodissociation of C2N2 at 193nm were measured. It was found that the rotational distribution is the same for radicals formed in the $v'' = 0$ and $v'' = 1$ level. This means, that the rotational motion is decoupled during the dissociation, from the vibrational and translational motion of the fragments. The partitioning of the 6795/cm of available energy between vibrational and translational motion in turn has been found to be consistent with a simple statistical model. The observed rotational distribution was reproduced by assuming that there is no contribution to the angular momentum of CN other than the original angular momentum of the parent. Author (GRA)

N82-17304# Pennsylvania Univ., Philadelphia.
ANGLE-RESOLVED PHOTOEMISSION STUDY OF Co-Co (0001)
D. Heskett, F. Greuter, H.-J. Freund, and E. W. Plummer 4 Nov. 1981 8 p refs Submitted for publication
(Contract N00014-79-C-0991; NR Proj. SRO-013)
(AD-A107575; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/5

In this study the techniques of LEED and angle and energy resolved photoemission were used to investigate some of the properties of CO/Co(0001). The orientation of the CO molecules was determined using well established symmetry selection rules. The CO - CO direct interaction was measured by mapping out the E vs. k4 dispersion of the 4 sigma and combined 5 sigma/1 pi levels of CO in several directions in the Surface Brillouin Zone (SBZ) at two coverages of CO, corresponding to the saturated room and low (170 K) temperature phases. The dispersion can be related to the size and shape of the SBZ and

correspondingly to the geometry of the CO overlayer in real shape. After preliminary LEED work, a photoemission study was performed at the Synchrotron Radiation Lab of the University of Wisconsin. Two distinct peaks were seen in the UPS spectra of CO/Co(0001) with p-polarization of the incident light, as is generally observed on other transition metals. The consensus is that the level with the higher binding energy (at approx. 11 eV) corresponds to the 4 sigma level of the isolated CO molecule, while the level at approx. 8 eV is a superposition of the molecular 5 sigma and I pi levels, with the 5 sigma level having undergone a bonding shift of approx. 3 eV with respect to the free molecule. Author (GRA)

N82-17305# Southwest Research Inst., San Antonio, Tex. Energy Systems Research Div.

MECHANISMS OF SMOKE REDUCTION IN THE HIGH PRESSURE COMBUSTION OF EMULSIFIED FUELS. VOLUME 1: CONSTRUCTION OF APPARATUS AND PRELIMINARY EXPERIMENTS Progress Report, 29 Sep. 1980 - 29 Sep. 1981

Lee G. Dodge and Clifford Moses Oct. 1981 36 p refs

(Contract N00014-80-K-0460)

(AD-A108018; SwRI-MED 130-Vol-1; PR-1) Avail: NTIS HC A03/MF A01 CSCL 21/2

Progress made to date in study of the atomization and evaporation characteristics of emulsified and alternative fuels in model gas turbine engines is reported. The development of spray drop-size diagnostics suitable for use in a combustion environment was studied. A disc-in-duct combustor with a pipe I.D. of 15.04 cm and a disc O.D. of 7.19 cm was constructed and operated. Optical access was available through 3 x 4 in. quartz windows. A delavan 5.0 gallon per hour 45 deg cone angle hollow-cone nozzle was completely characterized at atmospheric conditions on calibration fluid, Jet-A, a Jet-A/20% water macroemulsion, and a Jet-A/20% water microemulsion. Variations of drop size along the nozzle axis and radially outward were documented. Modifications to the drop-sizing laser diffraction equipment to permit combustor measurements are described. Preliminary data for a comparison of atomization of a neat fuel and a macroemulsion fuel are presented. Measurements in high temperature/pressure noncombusting air and measurements in an operating combustor are presented. Author

N82-17306# Wisconsin Univ. - Madison. Dept. of Chemistry

EFFECTS OF TEMPERATURE ON EXCITED-STATE DESCRIPTION OF LUMINESCENT PHOTOELECTROCHEMICAL CELLS EMPLOYING TELLURIUM-DOPED CADMIUM SULFIDE ELECTRODES

Arthur B. Ellis and Bradley R. Karas 6 Oct. 1981 15 p refs

(Contract N00014-78-C-0633; NR Proj. 051-690)

(AD-A107840; TR-7) Avail: NTIS HC A02/MF A01 CSCL 07/4

The need for alternate energy sources has led to the rapid development of photoelectrochemical cells (PECs). A PEC consisting of an n-type semiconductor, a counterelectrode, and a suitably chosen electrolyte can convert optical energy directly into chemical fuels and/or electricity (1,2,3,4). We recently reported that tellurium-doped CdS (CdS:Te) mimics undoped CdS in its ability to sustain the conversion of monochromatic ultraband gap light (> or about = 2.4 eV; lambda < or about = 500 nm (5)) into electricity at about 7% efficiency in PECs employing aqueous polychalcogenide electrolytes (6,7,8,9). A novel feature of the CdS:Te photoanodes is that they emit lambda sub max about 600 nm for 100 ppm CdS:Te) with about 0.1% efficiency while effecting the oxidation of polychalcogenide species. GRA

N82-17307# California Univ., Los Angeles. Dept. of Chemistry.

TEMPORAL AND TEMPERATURE DEPENDENCE OF THE ENERGY TRANSFER PROCESS AMONG Eu-3(+) IN AN AMORPHOUS SOLID

Jack R. Morgan and Mostafa A. El-Sayed 20 Nov. 1981 22 p refs Submitted for publication

(Contract N00014-75-C-0602; NR Proj. 056-498)

(AD-A107951; TR-40) Avail: NTIS HC A02/MF A01 CSCL 20/5

The time dependence of the 5DO-7FO excitation energy transfer between Eu3+ ions in different sites within the inhomogeneous profile for 30 mole percent Eu3+ in Ca (PO3)2 glass is studied at different temperatures. Fluorescence laser narrowing techniques are used and the decay curve of the resonant (donor) fluorescence was analyzed. The temporal fit to the Inokuti-Hirayama equation shows that while dipole-dipole, dipole-quadrupole-quadrupole mechanisms may describe the transfer at short time, the dipole-dipole mechanism describes the transfer at short time, the dipole-dipole mechanism describes the transfer until approx. Ninety percent of the excitation has been transferred. Only after 95% of the excitation is transferred in the concentrated samples and at T greater than or equal to 298 K was a fit to diffusion type behavior observed. GRA

N82-17308# Cornell Univ., Ithaca, N. Y.

ASYMPTOTIC METHODS ESPECIALLY IN COMBUSTION Final Report, 15 Sep. 1977 - 14 Jun. 1981

G. S. S. Ludford Nov. 1981 8 p refs

(Contract DAAG29-79-C-0121; Grants DAAG29-77-G-0210; DAAG29-78-G-0134)

(AD-A108023; ARO-14933.9-M; ARO-15882.31-M) Avail: NTIS HC A02/MF A01 CSCL 21/2

Modern asymptotic methods have been applied to a wide range of problems in combustion science as well as a few in magnetohydrodynamic and fluid mechanical questions. Details are contained in the 39 Technical Reports, 6 Ph.D. Thesis, and 1 Master's Thesis listed. A list of participating scientists is given. Author (GRA)

N82-17309# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

DECONVOLUTION OF CHROMATOGRAMS Final Report, 1981

Dorn W. Carlson and E. Gordon Powell 14 Sep. 1981 25 p refs Submitted for publication

(ZR0000101)

(AD-A107608; NSWC/TR-81-307) Avail: NTIS HC A02/MF A01 CSCL 07/4

A simple deconvolution algorithm based on a special case of the Scofield iterative technique was developed for use in deconvolving gas and liquid chromatograms. This algorithm required the use of only very limited computer equipment, such as a BASIC programmable integrator. This technique can in certain cases sharpen chromatographic peaks mathematically to the extent that nonresolved shoulders or doublets can be resolved and quantified. GRA

N82-17310# Wisconsin Univ. - Madison. Dept. of Chemistry.

LUMINESCENT PHOTOELECTROCHEMICAL CELLS. 6: SPATIAL ASPECTS OF THE PHOTOLUMINESCENCE AND OF CADMIUM SELENIDE ELECTRODES

Holger H. Streckert, Jiu-ru Tong, and Arthur B. Ellis 6 Oct. 1981 41 p refs Submitted for publication

(Contract N00014-78-C-0633; NR Proj. 051-690)

(AD-A107580; TR-8) Avail: NTIS HC A03/MF A01 CSCL 07/5

Interfacial charge-transfer processes at semiconductor electrodes is under active investigation, as befits the semiconductor's role as the key element of photoelectrochemical cells (PECs). The use of luminescence as a tool for examining charge-transfer events occurring at n-type CdS and CdS:Te (Te-doped CdS) electrodes was reported. Photoluminescence was studied while these electrodes served as photoanodes in PECs employing polychalcogenide electrolytes. Photoluminescence could be initiated by using the semiconductors as dark cathodes in alkaline, peroxydisultate media. Photoluminescence (PL) and electroluminescence (EL) represent two methods for populating the excited-state manifold of CdSe. PL studies were conducted in air and in a PEC. These experiments aid in the assignment of the emissive transition and detail its spectral distribution, efficiency, and perturbation by the passage of current in a PEC. The analogous EL charactristics of spectral distribution, efficiency and potential dependence, implications of comparisons of PL and EL properties are discussed. The effects of various surface treatments on the PL properties of CdSe are also discussed. GRA

N82-17311# Wisconsin Univ. - Madison. Dept. of Chemistry.

LUMINESCENT PHOTOELECTROCHEMICAL CELLS. 7: PHOTOLUMINESCENT AND ELECTROLUMINESCENT

PROPERTIES OF CADMIUM SULFO-SELENIDE ELECTRODES

Holger H. Streckert, Jiu-ru Tong, Michael K. Carpenter, and Arthur B. Ellis 6 Oct. 1981 39 p refs Submitted for publication
(Contract N00014-78-C-0633; NR Proj. 051-690)
(AD-A107581; TR-9) Avail: NTIS HC A03/MF A01 CSCL 07/5

Photoelectrochemical cells (PECs) are being widely studied as devices for optical energy conversion. The excited-state properties of the semiconductors around which PECs are constructed are crucial to efficient energy conversion. We have employed luminescence as a probe of these excited-state-properties, generally using materials such as n-type CdS:Te(Te-doped CdS) which exhibit subband gap emission. Recently we examined emission of band gap energy from n-type CdS and CdSe, two materials which have been used extensively in PEC studies. Since these two compounds form solid solutions over the entire composition range, the mixed compounds represent a natural extension of our emissive studies. We report herein that luminescence from samples of n-type, single-crystal CdSXSe1-X can be used to probe interfacial charge-transfer events relevant to PECs. Specifically, we demonstrate that photoluminescence (PL) can be perturbed and electroluminescence (EL) initiated by interfacial charge-transfer processes. GRA

N82-17312# Duquesne Univ., Pittsburgh, Pa. Dept. of Chemistry.

HYDROGEN BONDING IN ASPHALTENES AND COAL LIQUIDS Quarterly Report, 1 Aug. - 31 Oct. 1981

N. C. Li 1981 30 p refs
(Contract DE-AC22-80PC-30252)
(DE82-001131; DOE/PC-30252/T5) Avail: NTIS HC A03/MF A01

The middle distillate from Illinois No. 6 solvent-refined coal (SRC II) was studied and found relatively stable to aging by direct oxygenation at 335 K. Metallic copper accelerates oxygen aging as evidenced by an increase in viscosity and formation of pentane-insoluble components. Infrared spectra after aging showed a significant reduction in the intensity of the free hydroxyl band. FTIR spectra showed that oxygen-containing compounds of the coal liquid were concentrated in the pentane-insoluble fraction, and that the oxygen bubbled into the coal liquid was incorporated into the structure of this fraction. Gel permeation chromatograms also showed the formation of large molecular size aggregates during aging. 600 MHz NMR spectra of the aged pentane-soluble fraction were similar to those of the unaged acid-free fraction. GC-MS analysis of the aged pentane-soluble fraction showed that the phenol, cresol, xylenol and indanol peaks are much smaller in intensity, compared to the original middle distillate. DOE

N82-17313# Physical Sciences, Inc., Woburn, Mass.

EFFECTS OF PREIGNITION ON PULVERIZED-COAL COMBUSTION Quarterly Report, 1 Jul. - 30 Sep. 1981

G. A. Simons and G. Kothandaraman Nov. 1981 39 p refs
(Contract DE-AC22-80PC-30293)
(DE82-002565; DOE/PC-30293/4; PSI-TR-290) Avail: NTIS HC A03/MF A01

Pore structure optimization study results predict that high reactivity chars require high porosities and a higher concentration of large pores. The dependence of these quantities on heating rate and final temperature was noted. Data for Texas Lignite suggest that heating rate does not affect pore structure to the extent that the pore structure will significantly affect reactivity but a tendency for higher heating rates to increase the relative number of large pores was observed. Increased final temperatures do tend to increase char porosities. Pyrolysis experiments at heating rates of 1 to 150 K/s and final temperatures of 800 to 13000 K were performed on PSOC 140 coal. Resulting chars were analyzed. It was found that the porosity increased from 0.15 for the coal to 0.40 for the 13000 K char. Mercury intrusion data suggest that a significant portion of this increased porosity lies in the micropores. This finding, however, is preliminary. The porosity, distribution of porosity with pore size, and the total mass loss are only weakly dependent on heating rate. Refinements in the theory of pore evolution, particularly in the generation of small pores, are depicted by the data generated. DOE

N82-17314# Amoco Oil Co., Naperville, Ill. Research and Development Dept.

COAL-LIQUEFACTION CATALYST DEVELOPMENT Quarterly Progress Report, 1 Oct. - 30 Dec. 1980

J. A. Mahoney and J. J. Helstrom Mar. 1981 54 p
(Contract DE-AC22-79ET-14803)
(DE82-000137; DOE/ET-14803/T6; QPR-5) Avail: NTIS HC A04/MF A01

The materials initially deposited onto the catalyst were determined. A large amount of coke with an H/C ratio of 1.13 was deposited. The deposition of trace metals was also quite severe, and high levels of iron and titanium were found. At the same time there was a substantial corresponding reduction in surface area and pore volume. The sulfur is already at the usual level found in used catalysts, reflecting the condition that the major portion of the sulfur is probably combined with the sulfided cobalt and molybdenum; it would appear that only a minor part of the sulfur is combined with the coke. These results might indicate that, although a considerable amount of coke has been deposited, it is quite permeable in the early part of the experiment and becomes less permeable with time. DOE

N82-17315# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.

CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION: CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS Quarterly Progress Report, Apr. - Jun. 1981

Wendell H. Wiser Aug. 1981 56 p refs
(Contract DE-AC22-79ET-14700)
(DE82-000762; DOE/ET-14700/7) Avail: NTIS HC A04/MF A01

A technique was developed to measure active sites on a sulfided CoMo/Al2O3 catalyst by gravimetric measurements of O2 chemisorbed at -780 C in a dilute air/He stream. It was found that neither polarity nor concentration affected effective diffusivity of solutes in a porous catalyst support, which confirmed earlier results that surface diffusion is not operative in these systems, and that the dominant factor which determines diffusivity appears to be a drag coefficient. Reports of the following task groups with summaries are presented: chemical-catalytic studies; carbon-13 NMR investigation of CDL and coal; catalysis and mechanism of coal liquefaction; fundamental chemistry and mechanism of pyrolysis of bituminous coal; catalytic hydrogenation of CD liquids and related polycyclic aromatic hydrocarbons; denitrogenation and deoxygenation of CD liquids and related N- and O-compounds; and catalytic cracking of hydrogenated CD liquids. DOE

N82-17316# Strasbourg Univ. (France). Centre de Recherches Nucleaires.

INDUCED LUMINESCENCE BY CHARGED PARTICLES ON GASEOUS, LIQUID AND SOLID ARGON Ph.D. Thesis

M. J. CarvalhoTorres 1980 286 p refs In FRENCH
(CRN-CPR-80-10) Avail: NTIS (US Sales Only) HC A13/MF A01; DOE Depository Libraries

A spectral and a kinetic study of the scintillation induced by (ALPHA) and (-) particles in gaseous, liquid and solid argon have been made in the wavelength region comprised between 1100 and 3000A. The radiative lifetimes and some spectroscopic parameters of the lowest dimer states have been determined: By applying an electric field the contribution of the electron-ion recombination mechanism to the gaseous argon scintillation is studied. For condensed argon, the dependence of the ratio between the fluorescence and the phosphorescence intensities on the ionization power of the impinging particle is verified. The continuum which extends from 1600 to 2900A and that is present only in the gas phase spectra, is ascribed to the radiative de-excitation of molecular ions. A time resolved study of the luminescence of high pressure (1-15atm) argon excited by a pulsed electric discharge has also been performed and is compared with that of the scintillation induced by nuclear particles. DOE

N82-17317# Argonne National Lab., Ill. Chemical Engineering Div.

SAMPLING AND ANALYSIS OF HYDROCARBONS IN COMBUSTION GASES Quarterly Report, Jan. - Mar. 1981

I. Johnson, D. C. Fee and K. M. Myles Aug. 1981 24 p refs

(Contract W-31-109-eng-38)
(DE82-002511; ANL-CEN-FE-81-7) Avail: NTIS HC A02/MF A01

Real-time on-line methods for the chemical analysis of ultratrace levels of polycyclic organic compounds in the flue gases from fluidized-bed coal combustors were evaluated. The technique that currently shows the most promise for on-line monitoring is atmospheric-pressure-ionization triple quadrupole mass spectrometry. DOE

N82-17318# Aerospace Corp., Los Angeles, Calif. Energy and Resources Div.

DEVELOP SOLAR FUELS AND CHEMICALS TECHNOLOGY AND PERFORM SUPPORTING SYSTEMS ANALYSIS Final Report

30 Apr. 1981 36 p ref
(Contracts DE-AI01-79ET-21036; F-04701-80-C-0081)
(DE81-023960; ATR-81(6822)-1ND) Avail: NTIS HC A03/MF A01

Theoretical chemical thermodynamics studies related to carbon cycles for the production of fuel and chemicals are described. Experimental validation of potential rate-limited reactions are directed at verifying the reduction of CO2 or CO to carbon with metallic cadmium. The apparatus, procedures and results are presented for reduction of carbon dioxide by various carbonaceous materials. DOE

N82-17319# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

INVESTIGATIONS OF ELEMENTARY REACTIONS OF THE NHZ RADICAL WITH A CHEMICAL RADICAL SOURCE Ph.D. Thesis - Georg-Auguste Univ. [UNTERSUCHUNGEN VON ELEMENTARREAKTIONEN DES NH2-RADIKALS MIT EINER CHEMISCHEN RADIKALQUELLE]

Michael R. Schroeter Feb. 1981 107 p refs In GERMAN
(MPIS-2/1981; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19, 05

An isothermal flow system reaction of NH2 radicals with harmful materials and fuels over a wide temperature and pressure range was investigated. The reactions with nitrous oxides enable the coversion of these compounds into stable harmless products like molecular nitrogen. The importants of data on the conversion reaction rate of NH2 radicals with hydrocarbons is emphasized. Transl. by E.A.K.

N82-17320# California Analytical Lab., Sacramento.

DETERMINATION OF VOLATILE ORGANICS IN INDUSTRIAL AND MUNICIPAL WASTEWATERS Final Report

Jerry L. Wilson Aug. 1981 81 p refs Prepared in cooperation with Carborundum Co.
(Contract EPA-68-03-2635)
(PB82-119090; EPA-600/4-81-071) Avail: NTIS HC A05/MF A01 CSCL 07D

The systematic evaluation of a series of parameters leading to the development of a test procedure for 36 volatile priority pollutants in wastewaters is described. A study of the effect of pH, temperature, and residual chlorine on the aqueous stability of the compounds leads to recommended preservation techniques. Solvent extraction and purge and trap techniques are examined, with special emphasis on trap material, GC packings and detectors. The resulting test procedures were applied to selected wastewaters to develop accuracy and precision data. GRA

N82-17321# Atlanta Univ., Ga.

DEVELOPMENT OF METHODS FOR THE STABILIZATION OF PYROLYTIC OILS Final Report

Malcolm B. Polk and M. Phingbodhippakkiya Sep. 1981 86 p refs
(Grant EPA-R-804440)
(PB82-108150; EPA-600/2-81-201) Avail: NTIS HC A05/MF A01 CSCL 07D

Capillary gas chromatographic, liquid chromatographic and coupled gas/mass spectrometric analysis procedures were developed to analyze pyrolytic oils produced from cellulosic waste residues. Some of the major components identified were: ethanol, 1-butanol; acetaldehyde; furfuryl alcohol; 5-methylfurfural; and 4-hydroxy-3-methoxystyrene. The pyrolytic oils contained a number of valuable chemicals. Further investigations on the isolation of these valuable chemicals from pyrolytic oils are recommended. GRA

N82-17322# Cambridge Univ. (England). Dept. of Engineering.

INFLUENCE OF STRAIN ON FLAME PROPAGATION IN LAMINAR FLOW

H. Daneshyar and J. M. C. Mendes-Lopes 1981 19 p refs
(PB82-114588; CUED/A-THERMO/TR-14-1981;
ISSN-0309-6513) Avail: NTIS HC A02/MF A01 CSCL 21B

The influence of velocity gradients, in a laminar approach flow, on the local burning velocity was investigated, to supplement and verify recent theoretical work. Different velocity profiles were obtained at the exit from a circular burner, using pipes of different lengths between the exit and a settling chamber, and these profiles were measured using hot wire anemometry. The burning velocity and the velocity component parallel to the flame front were obtained by means of the 'angle method' using direct photographs of the flame. The results, presented as burning velocity versus velocity gradient along the flame front, show that the local laminar burning velocity decreases as the rate of 'stretching' of the flame is increased. GRA

N82-17323# Battelle Columbus Labs., Ohio.

MODELING OF SO2 OXIDATION IN SMOG Final Report

David F. Miller Jun. 1981 150 p refs
(Grant EPA-R-805335)
(PB82-101932; EPA-600/3-81-040) Avail: NTIS HC A07/MF A01 CSCL 07D

Smog chamber experiments were conducted to investigate the: (1) kinetics of free radical reactions of SO2 in smog and (2) SO2 transformation to sulfate for atmospheric simulations. Rate constants were derived for the following reactions: SO2+HO+M yields sulfate (60), SO2 + HO2 yields sulfate (61), SO2 + CH3O2 yields sulfate (64); k(60) = 1600 k(61 less than 0.2, k(64) less than 0.8 ppm min. Oxidation of SO2 by HO led exclusively to particulate sulfate. Even under favorable NOx conditions, particulate nitrate was not a product. Hydrocarbon mixtures typical of urban environments promoted SO2 oxidation faster than hydrocarbons selected to represent rural conditions. Maximum rates of SO2 oxidation occurred during periods of peak NO2 formation. SO2 oxidation rates for aged smog were 25-35% of the maximum values. Model calculations indicated that reaction 60 dominates sulfate production from SO2 in polluted air. Models that adequately estimate (HO) in smog should suffice to approximate the conversion rates. The model used in this study indicated that SO2 oxidation depends strongly on solar radiation intensity and pollutant conditions. GRA

N82-17324# Texas A&M Univ., College Station.

SEPARATION OF GAS MIXTURES BY SELECTIVE EXTRACTION Final Report, 25 Feb. 1980 - 24 May 1981

D. A. Nelson May 1981 87 p refs Prepared for Battelle Pacific Northwest Lab.
(Contract GRI-5014-361-0282)
(PB82-103839; GRI-80/0071) Avail: NTIS HC A05/MF A01 CSCL 07D

The chemical separation of oxygen from air by the use of coordination complexes were identified and demonstrated. The formation and equilibrium constants of six Co(II) complexes, prepared from benzylated ligands, were determined. Benzylated bis(salicylidene)dipropylenetriamine (benzyl saldpt) provided the most encouraging results. Thus, saldpt was attached through its 5-imino position to polystyrene. This material was complexed with Co(II) to give polymer-attached Co(saldpt). The polymer-attached complex reversibly sorbed oxygen at -70 and 23C. An induction period of about 65 minutes was observed during oxygen sorption at 23 C. The maximum oxygen uptake during sorption-desorption cycling was 46% of theoretical assuming superoxide formation. Kinetic measurements were performed in dioxane solution with Co(saldpt) attached to uncross-linked polystyrene. A preliminary economic assessment suggested that capital and energy costs for a commercial oxygen separation process based on polymer-attached Co(saldpt) would be competitive with the cryogenic distillation and pressure-swing processes. GRA

N82-17325# National Bureau of Standards, Washington, D.C. Thermophysical Properties Div.
AN EQUATION OF STATE FOR FLUID ETHYLENE
R. D. McCarty and R. T. Jacobsen Jul. 1981 164 p refs (PB82-107673; NBS-TN-1045) Avail: NTIS HC A08/MF A01 CSCL 07D

A thermodynamic property formulation for ethylene, is presented. The formulation includes an equation of state, vapor pressure equation, and equation for the ideal gas heat capacity. The coefficients were determined by a least squares fit of selected experimental data. Comparisons of property values calculated using the equation of state with measured values are given. The equation of state is not valid in the critical region rho(c) + or - 0.3 rho(c) for temperatures of T(c) + or - 0.05 T(c). Errors on the order of 20 percent for derived properties and 10 percent for density are encountered near the critical point. Tables of the thermodynamic properties of ethylene for the liquid and vapor phases for temperatures from the freezing line to 450 K with pressure to 40 MPa are presented. GRA

N82-17326 Arizona Univ., Tucson.
INVESTIGATION OF SPECTROSCOPIC PROPERTIES OF FLAMES AND PLASMAS VIA COMPUTER CONTROLLED INSTRUMENTATION Ph.D. Thesis
John Donald Algeo 1981 248 p
Avail: Univ. Microfilms Order No. 8125750

Data showing the sensitivities observed with a Babington type nebulizer and a flame emission spectrophotometer at varying flow rates of both the nebulizing gas and the sample solution are presented, along with an evaluation of several nebulizer configurations and tip styles. This nebulizer was used to develop a method for the analysis of wear metals in oil which does not require sample pretreatment. The effect of polymeric viscosity index improving additives commonly added to motor oils on the sensitivity of the method was explored. A new method is described for numerically evaluating the inverted Abel integral equation, used to extract information about interior regions of flames and plasmas from spatially resolved data obtained from side-on measurements. The method is based upon cubic spline approximations. Results give a basis for selecting the best method for transforming experimental data of varying quality, and also for estimating the reliability of the results of the computation. Dissert. Abstr.

N82-17327 Arizona Univ., Tucson.
MECHANISTIC STUDIES ON THE EXTRACTION OF COPPER(11) BY HYDROPHOBIC REAGENTS Ph.D. Thesis
Stephen Paul Carter 1981 89 p
Avail: Univ. Microfilms Order No. 8126171

A high speed stirring apparatus for following the kinetics of very rapid solvent extractions was used to determine the rate law for the extraction of copper by 2-hydroxyl-5-nonyl benzophenone oxime (I) and 5-dodecyl-2-hydroxyl benzophenone oxime (II). The rate law for the extraction of copper by I catalyzed by 5,8-diethyl-7-hydroxy-6-dodecanone oxime (III) was also determined. Equilibrium data are used to characterize the stoichiometry of the extracted complexes. Distribution constants between chloroform and water were determined for each ligand. The rate equations for the extraction of copper by I and II, and for the extraction of copper by I catalyzed by III, are all first order in metal ion, second order in ligand, and inverse first order in hydrogen ion. The catalytic rate law is first order in each ligand. In the case of the reactions which are second order in ligand, the rate determining step is proposed to be the aqueous phase reaction of a 1:1 intermediate complex with the second ligand molecule. Second order reaction rate constants for I and II are calculated. In the case of the catalytic mechanism, the rate law cannot be used to discern which ligand reacts in the rate determining step. The homogeneous phase mechanism is found to be the better mechanistic interpretation of these reaction systems. Dissert. Abstr.

N82-17328 Carnegie-Mellon Univ., Pittsburgh, Pa.
A RADIO-FREQUENCY MOVING-BOUNDARY DETECTOR AND ITS APPLICATION Ph.D. Thesis
Kuo-Shin Lee 1981 130 p
Avail: Univ. Microfilms Order No. 8127353

A radio frequency moving boundary detector for the measurement of transference numbers. The velocity of the boundary is determined by its passage past wire electrodes fixed to the external surface of the moving boundary tube. Cation transference numbers for magnesium chloride in water at 25 C, sodium and potassium dodecylsulfate in water at 25 and 40 C, respectively, and potassium and tetraethylammonium perchlorate in propylene carbonate at 25 C were measured and extrapolated to infinite dilution. The limiting cation constituent transference number was combined with the known limiting conductance for the chloride ion to give equivalent conductances. Transference numbers for aqueous sodium dodecylsulfate at 25 C were measured between 0.003 and 0.025 M, beyond which concentration the boundary movement became so slow that precise measurements were not possible. No evidence for premicellar association into dimers was produced. The effect of adding 1-heptanol to sodium dodecylsulfate were studied by both conductance and transference number experiments. In propylene carbonate, transference numbers of two strong electrolytes with a common anion were measured, and used to construct a table of the best estimated limiting ionic conductances for the calculation of partial molal ionic volumes from density and ultrasonic vibration measurements. Dissert. Abstr.

N82-17838# Joint Publications Research Service, Arlington, Va.
ASSAY OF DISSOLVED CARBON IN RECLAIMED WATER PRODUCED IN SPACECRAFT WATER SUPPLY SYSTEMS
Yu. S. Koloskova, Z. P. Pak, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 126-129 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 87-89 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-17329 Illinois Univ. at Urbana-Champaign.
CHARACTERIZATION OF THE ELECTRONIC AND MOLECULAR STRUCTURES OF TRANSITION METAL SEMIQUINONE AND CATECHOLATE COMPLEXES Ph.D. Thesis
Michael William Lynch 1981 252 p
Avail: Univ. Microfilms Order No. 8127633

Several metal/quinone complexes were synthesized utilizing manganese, iron, cobalt, and nickel and the following two ligands: 9,10-phenanthrene quinone, (PhenQ, PhenSQ, and PhenCAT), and 3,5-di-tert-butyl-1,2-benzoquinone, (DBQ, DBSQ, and DBCAT). These complexes were studied by a variety of physical techniques. It was concluded that the semiquinone is a paramagnetic radical which can be stabilized by coordination to a metal. The electron distribution within these complexes is very sensitive to the specifies of the metal, quinone, and other ligands, to temperature, and to solvent media. An X-ray crystal structure was solved for one of the nickel complexes. The X-ray crystal structures of two manganese complexes are presented. Several other ion complexes were studied. Dissert. Abstr.

N82-17330 Ohio State Univ., Columbus.
PLANAR, SQUARE-PYRAMIDAL AND MACROCYCLIC TRANSITION METAL COMPLEXES PREPARED FROM LINEAR TETRADENTATE DIAMINEDIPHOSPHINE LIGANDS Ph.D. Thesis
Lawrence George Scanlon, Jr. 1981 205 p
Avail: Univ. Microfilms Order No. 8121851

Planar Ni(II), Co(II), and PD(II) complexes were prepared with trimethylene-bis [2-aminoethyl)phenylphosphine] (2,3,2-N2P2) and trimethylene-bis [(3-aminopropyl)phenylphosphine] (3,3,3-N2P2). Square-pyramidal cobalt(II) and nickel(II) complexes also were prepared with 3,3,3-N2P2. Macrocyclic complexes were synthesized by cid-catalyzed rearrangement of sexadentate phosphinamino Schiff-base Ni(II) complexes prepared from one equivalent of Ni(OAc)2 x 1 4H2O and bis(acetylacetone) trimethylene-bis [2-aminoethyl)phenylphosphine]. The metal complexes were characterized by elemental analyses, by magnetic

and conductivity data, and by electronic, infrared, and nmr spectra. The crystal structures of [NiCl(3,3,3-N2P2)] PF6, [CoCl (3,3,3-N2P2]] BF4 x 0.8H2O, and [Ni(Me2 16] diene N2P2)] (PF6) 2 x 0.5H2O were also obtained. Dissert. Abstr.

N82-17331 North Carolina Univ. at Chapel Hill.
SUBSTITUTION AND EXCITED STATE ELECTRON TRANSFER REACTIONS OF TRANSITION METAL COMPLEXES IN ORGANIZED MEDIA Ph.D. Thesis
Russell Hunter Schmehl 1981 246 p
Avail: Univ. Microfilms Order No. 8125617

The organization and reactivity of molecules incorporated into organized environments including monolayer films and assemblies and micelles is investigated. Two specific topics are addressed. The orientation and reactivity of free base porphyrins in monolayer films is discussed. The effect of aqueous micelles on excited state electron transfer reactions of transition metal complexes is also discussed. Monolayer films and assemblies were examined as probes of biological membranes and as model organized molecular systems for the study of energy and electron transfer. The photosynthetic chromophore, chlorophyll a, was examined in monolayer films and assemblies. Aqueous solutions of ionic surfactants forming micelles were proposed as possible microheterogeneous environments for the separation of the products of light induced electron transfer reactions. The quenching of a ruthenium bipyridyl complex, incorporated into the micelle, by both methyl and benzyl viologen adsorbed to the micelle is analyzed. Dissert. Abstr.

N82-17332 State Univ. of New York at Stony Brook.
THE STRUCTURAL CONSEQUENCES OF TRANSITION METAL BASICITY: INVESTIGATION OF VARIOUS GOLD COMPLEXES Ph.D. Thesis
Frederick E. Simon 1981 181 p
Avail: Univ. Microfilms Order No. 8126237

Bimetallic compounds with polar metal-metal bonds often have unusual molecular structures with acute angles between the acceptor metal and the adjacent ligands of the donor metal. In the past these unusual geometries were either ignored or explained in terms of semibridging ligands. The molecular structures of a series of compounds which contain metal-metal bonds between gold atoms and various first-row transition metal atoms were prepared. The metal-metal bonds in these compounds are among the most polar of known bonds and the resulting acute angle structures are due to the hybridization requirements of the transition metals which are acting as Lewis bases in these compounds. The results of experimental and theoretical studies have shown that the electrons of the polar bond are located primarily in d orbitals of the donor atom and thus have little stereochemical activity. These ideas can easily be extended to other known examples of bimetallic compounds with polar metal-metal bonds between atoms of the same or similar elements. Dissert. Abstr.

N82-17333 North Carolina Univ. at Chapel Hill.
THE CLUSTER APPROACH TO THE MAGNETIC SUSCEPTIBILITIES OF LOW-DIMENSIONAL COPPER CLUSTERS Ph.D. Thesis
Robert Reynolds Weller 1981 249 p
Avail: Univ. Microfilms Order No. 8125631

Theoretical calculations on the magnetic susceptibilities of 0, 1, and 2-dimensional copper complexes were made. A new computational method which eliminates failures was developed. Algorithms based on numerical methods are used in computer programs CAMS and CAMSFIT which are capable of handling ten spin centers and any isotropic Heisenberg spin exchange Hamiltonian. The magnetic susceptibilities of copper cluster compounds and infinite chains and sheets were examined. Finite clusters (Cu-pen) were examined using Hamiltonians and infinite systems were approximated. Infinite chains examined were the alternating Heisenberg linear chain (Cu-OTS, Cu-HTS, (N-Melz) 2CuCl2, and (4-pic)2CuCl2) and the linear chain with nearest neighbor and next-nearest neighbor interactions ((HzH)CuCl3 and [Me3en]CuBr2). A closed form rational expression was developed. A two dimensional sheet polymer ((NH3)2CuCO3) was examined using arrays of spins which contain the spin interactions present in the sheet. Dissert. Abstr.

N82-17334 Princeton Univ., N. J.
INVESTIGATION OF OXIDE BOUND TRANSITION METAL COMPLEXES Ph.D. Thesis
Michael David Ward 1981 314 p
Avail: Univ. Microfilms Order No. 8127756

The preparation, characterization and reactivity of metal-oxide (silica, titania) bound transition metal (M = Zr,Rh) complexes (prepared by interaction of a homoleptic transition metal alkyl and oxide hydroxyl groups) were investigated. In particular, hydride complexes were studied and were discovered to exhibit catalytic activity towards a number of transformations. The behavior of these systems suggested the presence of high valent electrophilic metal centers, which may have been more favorable compared to lower valent species due to the strong metal-oxygen (oxide) bond of the former. The support was best described as a sterically large 'ligand' in these complexes, which possessed basic oxygen sites capable of stabilizing protron released from heterolytic H2 activation processes effected by these species. Since the identity of these complexes was preserved by the [M-O] bond, they could be considered as well defined species and the reactivity described along lines similar to those used for soluble systems. Dissert. Abstr.

N82-17335*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REVIEW OF NASA PROGRESS IN THERMAL BARRIER COATINGS FOR STATIONARY GAS TURBINES
Philip E. Hodge, Robert A. Miller, Michael A. Gedwill, and Isidor Zaplatynsky 1981 16 p refs Presented at the Intern. Gas Turbine Conf., Houston, Tex., 9-12 Mar. 1981
(Contract EF-77-A-01-2593)
(NASA-TM-81716; DOE/NASA/2593-25; E-749) Avail: NTIS HC A02/MF A01 CSCL 11F

Ceramic thermal barrier coatings for industrial/utility gas turbines were investigated. In burner rig tests of a zirconia yttria/nickel chromium aluminum yttrium ZrO2-12w/0Y2O3/ NiCrAlY coating system on air cooled superalloy specimens, ceramic coating life (spallation) was sensitive to Na and V concentration in the fuel. The locations of coating spallation correspond to areas where combustion products were predicted to condense. Three new thermal barrier coating systems were identified. These are based on calcium silicate, ZrO2-8w/0Y2O3, and a MgO-NiCrAlY cermet. The spall resistance can be increased by reducing the ceramic layer thickness from 0.038 to 0.013 cm and by the use of more oxidation/corrosion resistant bond coats. S.L.

N82-17336# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
DEVELOPMENT STATUS OF THE 'ADHESION OF METALS' EXPERIMENT AND OF THE UHV CHAMBER FACILITY
N. Adorni, A. Ceserani, G. Cortellazzi (Control Systems, Cremona, Italy), G. Ghersini, G. Grugni, A. Oriani, T. Rossini, F. Rossitto (Politecnico di Milan), P. G. Sona, A. Squilloni et al 1981 13 p ref Presented at 21st Intern. Sci. Meeting on Space, Rome, 25-26 Mar. 1981
(CISE-1700) Avail: NTIS HC A02/MF A01

The goal of the experiment 'Adhesion of Metals' is the characterization of surface forces and interface energies at the contact between real Metal surfaces, and the impulse probing of transient phenomena associated to the adhesion mechanism. In the experiment, a small metallic sphere impacts against a metal target, and restitution coefficients, contact times and time behavior of contact forces are measured as a function of incoming sphere velocity. Computer simulation indicates that, in microgravity environment and under ultrahigh vacuum, such data can give useful information on the characteristics of the surface forces and interface energies involved in the adhesion mechanisms between colliding bodies. The development status is reported of the physical model developed to design the experiment and to interpret its results, and of the facility 'UHV Chamber', expecially designed and constructed to perform the experiment on board the first Spacelab mission. J.M.S.

N82-17337# Arizona State Univ., Tempe. Center for Solid State Science.
SULFUR IN THE CORROSION OF SUPERALLOYS Final Report, 10 Dec. 1977 - 15 Jul. 1981

J. Bruce Wagner, Jr. 6 Nov. 1981 39 p refs
(Contract DAAG29-70-C-0049; Grants DAAG29-78-G-0032; DAAG29-78-G-0060)
(AD-A107867; ARO-14925.2-MS) Avail: NTIS HC A03/MF A01 CSCL 11/6

Three interrelated sections of a study are reported. These were: (1) corrosion of nickel in SO2-O2-Ar gas mixtures at 800 C; (2) defect structure of calcia and of yttria-stabilized zirconia; and (3) diffusion of radio-tracer sulfur-35 and of tellurium 127m in calcia-stabilized zirconia. The corrosion study resulted in a confirmation of linear kinetics for corrosion of nickel in SO2-Argon gas mixtures at 800 C and an agreement of a self-consistent mechanism involving the migration of SO2 as a gas molecule through the outer NiO layer and dissociation at the inner sulfide layer as a rate determining step. The corrosion kinetics in 20 percent O2-variable SO2-balance argon and in 30 percent SO2 variable O2-balance argon were extremely rapid. These data did not show that interconnected stringers of sulfide through the outer NiO layer was responsible for the observed kinetics. GRA

N82-17338# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
SUPERPLASTIC ALUMINUM EVALUATION Final Report, 16 Apr. 1979 - 31 Dec. 1980
M. W. Mahoney and C. W. Hamilton Wright-Patterson AFB, Ohio AFWAL Jun. 1981 203 p refs Sponsored in part by Delaware Univ.
(Contract F33615-79-C-3218; AF Proj. 2401)
(AD-A107760; SC5214.34FR; AFWAL-TR-81-3051) Avail: NTIS HC A10/MF A01 CSCL 11/6

With the development of a process to produce fine grain aluminum alloys, it is now possible to superplastically form (SPF) structural aircraft components. This document presents results from several important areas which are considered to be critical to providing a realistic assessment of the technical and economic potential for superplastic forming structures using a high strength 7475 aluminum alloy. Areas of study included (1) the evaluation of structural applications; (2) the determination of superplastic forming limits; (3) a microstructural study of cavities formed during superplastic deformation; (4) the application of hydrostatic gas pressures to suppress cavitation, and (5) the effect of superplastic deformation on subsequent service properties.
Author (GRA)

N82-17339# Notre Dame Univ., Ind. Dept. of Metallurgical Engineering and Materials Science.
MICROSTRUCTURAL EFFECTS IN ABRASIVE WEAR Quarterly Progress Report, Dec. 1980 - 1 Jun. 1981
T. H. Kosel, M. C. Rao, H. R. Shetty, M. T. Fernandes, and N. F. Fiore 29 Oct. 1981 71 p refs
(Contract DE-AS02-77ET-10460)
(DE82-003653; DOE/ET-10460/16/17) Avail: NTIS HC A04/MF A01

This report describes research aimed at establishing quantitative relationships between microstructure and wear resistance of highly alloyed materials, including high-Cr white irons and experimental Co-base and Ni-base powder metallurgy (PM) alloys now used or potentially to be used in coal mining, handling, and gasification. The specific types of wear under study are low-stress abrasion and gouging wear encountered in mining, coal conversion, and transfer applications. During this period, work was concentrated on analysis of results. The many detailed observations obtained in the work on scratch test simulations of abrasive wear mechanisms have been summarized in drafts of three papers. The first, A Study of Abrasive Wear Mechanisms Using Diamond and Alumina Scratch Tests, is included as an appendix to this report and is being submitted for publication. Revision of the other papers is in progress. DOE

N82-17340# Technical Research Centre of Finland, Espoo. Metals Lab.
EFFECT OF SENSITIZATION AND COLD WORK ON STRESS CORROSION SUSCEPTIBILITY OF AUSTENITIC STAINLESS STEELS IN BOILING WATER REACTOR (BWR) AND PRESSURIZED WATER REACTOR (PWR) CONDITIONS
Hannu Haenninen and Irina Aho-Mantila May 1981 67 p refs
(VTT-88; ISBN-951-38-1245-0; ISSN-0355-6395) Avail: NTIS HC A04/MF A01

The influence of metallurgical variables on stress corrosion cracking of austenitic stainless steels, in particular AISI 304 and OX18H10T, was examined in O2 enriched BWR conditions (8 ppm O2) and in typical PWR conditions. Cracking susceptibility in BWR conditions is especially sensitive to alpha martensite content and sensitization. Cracking in alpha martensite compounds is intergranular and transgranular; it can not be related to sensitization. Sensitization induces cracking only in creviced conditions (double U-bend specimens) in AISI 304 steels. In creviced conditions OX18H10T steel exhibits cracking in solution annealed, stabilized and sensitized conditions. The sensitized material is most susceptible. Cracking in solution annealed and stabilized OX18H10T steel is intergranular and transgranular. In PWR conditions (O2 content < 2 ppb) no cracking is observed. Author (ESA)

N82-17341# Centre Technique des Industries Mecaniques, St. Etienne (France).
STUDY OF THE INDUSTRIAL USE OF ORGANIC ADDITIVES FOR TEMPERING Final Report [ETUDE DE L'EMPLOI INDUSTRIEL DES ADDITIFS ORGANIQUES POUR LA TREMPE]
J. Mansion and C. Bournicon May 1981 133 p In FRENCH
(CETIM-1-2G-15-0) Avail: NTIS HC A07/MF A01

Polymer base additives, used in an aqueous milieu in order to extend its cooling properties, were studied. An inventory of these products was made and their characteristics were determined in the laboratory. Industrial experiments were reviewed and the results were analyzed. An industrial shop, making use of these additives, was also observed. The application domain of this technique, additive selection criteria, and in-service behavior are defined. Author (ESA)

N82-17342# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CORROSION FATIGUE
Oct. 1981 92 p refs Presented at the 52nd Meeting of the AGARD Struct. and Mater. Panel, Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-316; ISBN-92-835-1402-5) Avail: NTIS HC A05/MF A01

The objectives, scope, and technical requirements of a cooperative program for corrosion fatigue testing and prevention/aircraft environment simulation fatigue testing are presented. An overview of current and supplemental programs designed to assess current protection systems for aircraft structures is also given. For individual titles, see N82-17343 through N82-17348.

N82-17343# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
MECHANISMS OF CORROSION FATIGUE
D. J. Duquette *In* AGARD Corrosion Fatigue Oct. 1981 12 p refs Sponsored in part by Office of Naval Research (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

An overview of experimental variables which are considered critical to understanding the mechanisms of corrosion fatigue of high strength aluminum alloys is presented. Based on this overview, an examination of previously proposed mechanisms is attempted. These models include anodic dissolution, surface energy reduction, and hydrogen embrittlement. It is concluded that hydrogen embrittlement of process zones at alloy surfaces (for crack initiation) and at crack tips (for crack propagation) best explains observed results. A general model of corrosion fatigue of these alloys is proposed. This model suggests that the nature of the naturally formed oxide film on aluminum alloys may be a critical factor. Chemical or mechanical damage of the film allows hydrogen ingress. The presence of second phase particles which may act as sinks for dislocation transported hydrogen, may also be a necessary prerequisite to significant amounts of reduction in fatigue resistance associated with corrosion. Author

N82-17344# Toronto Univ. (Ontario). Dept. of Mechanical Engineering.
FRACTURE MECHANICS BASED MODELLING OF THE

CORROSION FATIGUE PROCESS
David W. Hoeppner, Douglas Mann, and J. Weeks *In* AGARD Corrosion Fatigue Oct. 1982 17 p refs Sponsored in part by NSERC and Dept. of Energy, Mines and Resources of Canada (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

Corrosion fatigue of structural elements involves a synergism between cyclic load and a chemical environment involving both time and temperature as rate-controlling parameters. The development of rational life prediction methods is hampered by both the lack of mechanistic understanding, the large number of corrosion-fatigue synergisms, and the inadequacies of fracture mechanics based models in both pre mode I fatigue cracking and initial mode I cracking. Aspects of mechanisms related to the formulation of corrosion fatigue life prediction models are discussed in relation to micromechanical modelling based on fracture mechanics. Emphasis was placed on the formation of mode I fatigue cracks from pits, and fretting surface damage. A discussion of the needs in this area is presented. It is believed that with further analytical and experimental information the models presented can be verified and provide useful guidance to engineers and scientists attempting to deal with corrosion and fretting fatigue. Author

N82-17345# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Central Lab.
CORROSION FATIGUE BEHAVIOUR OF SOME ALUMINIUM ALLOYS
D. Aliaga and E. Budillon *In* AGARD Corrosion Fatigue Oct. 1981 12 p (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

An evaluation of corrosion fatigue strength of aluminum alloys currently used in the aeronautical industry was made. Crack propagation was evaluated in various different environments (dry argon, wet air, salt water). The effect of frequency, of test specimen thickness, and of ratio R (R = Kmin/Kmax) were investigated. And the effect of these various environments on the endurance limit of 10 to the 7th power cycles was likewise studied and some surface protections evaluated. The intent of the survey was to compare the response in fatigue of various aluminum alloys used in the aeronautical construction. The environments studied were the following: dry argon, wet air and salt-water. They were retained so as to simulate and amplify the more or less aggressive nature of these environments in which aircraft can find themselves both on the ground or in the air. The two major aspects of corrosion fatigue namely crack initiation and crack propagation were studied with an emphasis on in-service behaviour. As far as crack initiation is concerned some surface treatments and protections currently used in aeronautics were examined in various environmental conditions. M.D.K.

N82-17346# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
CORROSION FATIGUE OF OFFSHORE AND SHIP-BUILDING STEELS
Walter Schuetz *In* AGARD Corrosion Fatigue Oct. 1981 17 p refs (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

The results of several test programs on various steels are discussed where in addition to realistic variable loads a corrosive environment was simulated. For comparison, constant amplitude tests were also carried out as well as testing in air. It was shown that under constant amplitude loading the damaging effect of corrosion was always greater than under realistic loading. In addition, test frequency appears to be not so important as in constant amplitude test; this means that tests under variable amplitude can be carried out at normal test frequencies of the order of 10 Hz, saving time and costs. Finally the results of a research program on welded tubular joints in seawater are described in which the above conclusions were incorporated. Author

N82-17347# Middle East Technical Univ., Ankara (Turkey).
VARIABLE AMPLITUDE CORROSION FATIGUE BEHAVIOR OF A LOW CARBON STEEL
R. Guerbuez and M. Doruk *In* AGARD Corrosion Fatigue Oct. 1982 14 p refs (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

The results of an experimental study designed to determine the general characteristics of salt water-enhanced fatigue crack growth under conditions of variable amplitude loading are presented. The material used was a sheet of 0.22 percent carbon steel. The tests were done on 13 mm thick CT specimens in L-orientation. The crack mouth opening displacement on the loading line (C(M)OD) was varied at a constant rate, whereby the stress intensity factor varied between zero and the maximum value of C(M)OD. Negative stress ratios were eliminated by means of a special control. Comparison crack growth data were obtained by the more conventional constant load amplitude or K-increasing method and also under decreasing load amplitude. The crack growth rates were compared with reference data measured in the laboratory air. It was found that the rates of crack-growth measured at three different rates of displacement do not agree. However from the shift of curves on decreasing the rate, it is concluded that the growth rate curves would tend to become stationary. Author

N82-17348# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
FLIGHT-BY-FLIGHT CORROSION FATIGUE TESTS
Walter Schuetz *In* AGARD Corrosion Fatigue Oct. 1981 10 p refs (For primary document see N82-17342 08-26)
Avail: NTIS HC A05/MF A01

Corrosion fatigue tests should be conducted under realistic load sequences especially for tests with riveted specimens because the rare high loads of the spectrum may loosen the fasteners, damaging the corrosion protection system and therefore rendering it ineffective. Possibly this does not happen in constant amplitude tests because the loads may not be high enough to crack the protection system. This was the reasoning behind the test program carried out with flight-by-flight tests. Tests were carried out with two aluminum alloys typical for use in modern and in faying aircraft respectively, namely 7475-T 761 and 7075-T6. The sheet materials were exchanged between two laboratories so that both would use materials of the same heats. The specimens used differed, however, in the corrosion protection systems and in the manufacturing of the specimens by different firms. A project status report is made. M.D.K.

N82-17349# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AIRCRAFT CORROSION
Aug. 1981 194 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-315; ISBN-92-835-0298-1) Avail: NTIS HC A09/MF A01

Corrosion resistant materials and protection systems for aircraft are addressed. The incidence of corrosion of aircraft structures under varying environmental conditions is discussed. Maintenance, cost factors, education and retraining, and the communication link among the designers, manufacturers and the research community are among the topics covered. For individual titles, see N82-17350 through N82-17364.

N82-17350# Atlantic Fleet, Norfolk, Va.
US NAVAL FLEET AIRCRAFT CORROSION
G. T. Browne *In* AGARD Aircraft Corrosion Aug. 1981 15 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Water entry and its associated corrosion problems were minimized. A method for sealing environmental connectors without degrading wire quick disconnect capability was incorporated by sealing the back connector shell rubber grommet with clear room temperature vulcanizing silicone type sealant. The screw holes and equipment lids were also sealed in a similar manner. Drain holes were located and drilled in nonstructural areas at low points to remove trapped water and eliminate the corrosive agents. Hidden corrosion was detected by nondestructive inspection methods during rework. These include ultrasonic, X-ray and eddy current inspection and neutron radiography on double skin areas and on areas behind stringers, etc., where corrosion is caused by moisture entrapment. Stress corrosion cracking in high strength components was discovered occasionally. Standard fleet corrosion maintenance is accomplished in accordance with procedures provided in technical manuals. Paint and corrosion removal procedures and tools are discussed. N.W.

N82-17351# Royal Air Force, Dereham (England). Central Servicing and Development Establishment.
DETECTION AND PREVENTION OF CORROSION IN ROYAL AIR FORCE AIRCRAFT
C. R. Pye *In* AGARD Aircraft Corrosion Aug. 1981 10 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The problems that sometimes are created by corrosion in Royal Air Force aircraft are outlined. The problem of the harsh environment facing some military aircraft is described, and some of the materials used in aircraft construction are considered. Corrosion prevention and rectification is also discussed briefly. Some typical examples of corrosion damage found during service are illustrated, and the nondestructive testing methods used for detecting corrosion are described. These methods include visual inspection, eddy current techniques, ultrasonic techniques and X-radiography. The use of neutron radiography and other future developments is also considered. Service methods of removing corrosion and re-protecting the aircraft are mentioned. Finally the need for the manufacturer to consider corrosion at the aircraft design stage is considered. N.W.

N82-17352# British Airways, Middlesex (England). Aircraft Engineering (Structures).
AN AIRLINE VIEW OF THE CORROSION PROBLEM
R. G. Mitchell *In* AGARD Aircraft Corrosion Aug. 1981 11 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Although the corrosion phenomenon is well understood by aircraft manufacturers and operators alike, most current aircraft types continue to exhibit many of the fundamental corrosion defects shown by earlier designs. It is estimated that the total annual cost to IATA member airlines is around $100 million based on 1976 operations. Environmental and maintenance effects are important and should be fully understood in their importance in minimizing corrosive attack. In addition to the more common forms, filiform corrosion and microbiological contamination present hazards to aircraft operating in certain areas of the world. Temporary water displacing fluids are becoming common in their use, and subject to certain limitations are providing valuable short term protection. The FAA design rules require the effects of corrosion to be considered at the design stage which should result in an improved product for the operator. In addition the IATA document Guidance Material on Design and Maintenance Against Corrosion of Aircraft Structures specifies practices which should also improve the overall product. Author

N82-17353# Middle East Technical Univ., Ankara (Turkey).
SOME OBSERVATIONS ON THE CORROSION OF AIRCRAFT AT THE AIR FORCE BASE IN BANDIRMA, TURKEY
M. Doruk *In* AGARD Aircraft Corrosion Aug. 1981 8 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The types and the causes of corrosion which have been observed primarily on aircraft of Type F-5A in Turkey are studied. Visual inspection showed many locations of concentration of corrosion. The vertical stabilizer attach angle (alloy 7075-T6) fails through exfoliation corrosion and galvanic attack in the bolt holes. Galvanic corrosion has also been observed around the jaw bolts under the main wings. Another case of exfoliation attack has been found on the uplock support rib (Alloy 7075-T6 or 7079-T6) in the main landing gear well. Damage in the honeycomb assembly which appears as a debonding between the honeycomb structure and the top plate has been regarded as a serious problem. Corrosion damage is attributed to the high corrosiveness of the atmosphere of Air Force Base laden with sea salt and polluted from industries in the neighborhood. Author

N82-17354# Technical Univ. of Istanbul (Turkey).
ON THE CORROSION PROBLEMS OF THE TAF F-5 AIRCRAFT
A. Inalhan *In* AGARD Aircraft Corrosion Aug. 1981 1 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Corrosion problems of the F-5 aircraft in Turkey are examined. The importance of atmospheric effects are disputed. The investigation and conclusions are recounted. N.W.

N82-17355# Service Techniques des Programmes Aeronautiques, Paris (France).
THE EXPERIENCE OF CORROSION ON FRENCH MILITARY AERODYNES [L'EXPERIENCE DE LA CORROSION SUR AERODYNES MILITAIRES FRANCAIS]
Melle M. Huret *In* AGARD Aircraft Corrosion Aug. 1981 9 p In FRENCH (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Several examples of corrosion occurring in French military aircraft in detail, e.g., honeycomb sections and metal-to-metal adhesively bonded structures were described. Information about the various measures which were taken to diminish the problem was given. The manufacturing specifications do not take care of all protection requirements. Furthermore, the paint systems which are applied are not the best available, or they have been applied in the wrong way. Bad sealing also occurs frequently. Other preventive measures, e.g., water displacing fluids, can given additional, short term, protection. N.W.

N82-17356# KLM Royal Dutch Airlines, Amsterdam (Netherlands).
DESIGN AND MAINTENANCE AGAINST CORROSION OF AIRCRAFT STRUCTURES
H. J. Versteegen and M. J. M. Versteeg *In* AGARD Aircraft Corrosion Aug. 1981 7 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The publication 'Guidance Material on Design and Maintenance against Corrosion of Aircraft Structures' is reviewed. A greater understanding among manufacturers and airline managements of the magnitude of the corrosion problems and the need for measures to be taken at the design stage is considered. The best available anti-corrosion design knowledge in critical areas as a basic standard is addressed. The guidelines cover basic requirements, including material choice, design principles and manufacturing procedures. Furthermore, they cover the critical areas including origin of problems, design objectives and protective requirements. They are supplemented by an appendix giving a detailed acceptable means of compliance. N.W.

N82-17357# Michigan State Univ., East Lansing. Dept. of Metallurgy, Mechanics, and Materials Science.
FORECASTING CORROSION DAMAGE AND MAINTENANCE COSTS FOR LARGE AIRCRAFT
R. Summitt and F. Fink *In* AGARD Aircraft Corrosion Aug. 1981 11 p refs Sponsored by AF (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Studies relating environmental and operational factors of large aircraft to corrosion damage were conducted. They provide a basis for predicting maintenance costs and for logistics decisions. The studies included: (1) an Environmental corrosion severity index, based on pollutant and weather factors; (2) an atmospheric testing program to determine environmental corrosiveness; and (3) analysis of corrosion maintenance experience in aircraft systems. Results are discussed. M.D.K.

N82-17358# Royal Aircraft Establishment, Farnborough (England). Materials Dept.
CORROSION CONTROL MEASURES FOR MILITARY AIRCRAFT: PRESENT UK REQUIREMENTS AND FUTURE DEVELOPMENTS
V. C. R. McLoughlin *In* AGARD Aircraft Corrosion Aug. 1981 15 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

The philosophy behind selection of aircraft metallic materials based on resistance to corrosion and behind mandatory requirements for processes and materials used in the protection of aircraft structures is discussed. The impact of legislation, current and future, aimed at protecting the environment is reported. The necessity for finding replacements for cadmium, chromates, and various metal finishing operations used in aircraft construction is discussed in terms of both protecting the environment and corrosion control methods used in the aircraft industry. M.D.K.

N82-17359# Aeritalia S.p.A., Torino (Italy). G.V.C. Labs.
CORROSION PREVENTION METHODS DEVELOPED FROM DIRECT EXPERIENCE WITH AEROSPACE STRUCTURES
M. Scolaris *In* AGARD Aircraft Corrosion Aug. 1981 18 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Some examples of various types of corrosion experienced during hardware service are reviewed and the significant remedial action adopted first to repair and then to eliminate the problem are presented. The changes in design incorporated during design development as a function of the experience and technical knowledge acquired are also presented. Examples of effective protection validated through service life and present trends for effective corrosion prevention are also illustrated. Author

N82-17360# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
CORROSION PREVENTION MEASURES USED IN THE CONSTRUCTION OF AN AIRCRAFT AIRFRAME: THE CASE OF 2014 AND 2214 ALLOYS [SOLUTIONS PREVENTIVES UTILISEES CONTRE LA CORROSION LORS DE LA CONSTRUCTION D'UNE CELLULE D'AVION. CAS DES ALLIAGES 2014 ET 2214]
J. Bevalot *In* AGARD Aircraft Corrosion Aug. 1981 14 p In FRENCH (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Discussions of practical aircraft corrosion problems are presented. Aluminum alloy 2214 is evaluated in terms of its resistance to stress corrosion and its excellent fatigue properties. Heat treatment, aging at 178 C instead of 153 C, and the use of wet sandblasting techniques are discussed in terms of maintaining fatigue resistance while increasing resistance to stress corrosion. M.D.K.

N82-17361# Naval Air Development Center, Warminster, Pa.
RECENT DEVELOPMENTS IN MATERIALS AND PROCESSES FOR AIRCRAFT CORROSION CONTROL
Sara J. Ketcham and John J. DeLuccia *In* AGARD Aircraft Corrosion Aug. 1981 9 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Advances in materials and processes for aircraft corrosion control currently in use and those under development in the laboratory for future use are described. Areas covered are corrosion preventive compounds, organic and inorganic coatings, alloy selection and heat treatments. Available materials highlighted are water displacing compounds, sealant primers, aluminum alloys 7050 and 7010 including a state-of-the-art report on the use of exfoliation and stress corrosion resistant tempers. Materials under development that offer promise of contributing to future advances include water displacing paints, flexible primer, crack arrestment compounds, powder metallurgy, aluminum alloys and substitutes for cadmium plating. Author

N82-17362# Systems Research Labs., Inc., Dayton, Ohio.
NEW CONCEPTS IN MULTIFUNCTIONAL CORROSION FOR AIRCRAFT AND OTHER SYSTEMS
M. Khobaib and F. W. Vahldiek *In* AGARD Aircraft Corrosion Aug. 1981 13 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Multifunctional nonchromate inhibitors were developed for a Rinse Facility to reduce corrosion maintenance costs by removing corrosive contaminants from aircraft which operate in aggressive environments such as marine environments. These inhibitor systems are low cost, water soluble, nontoxic formulations which are effective against general corrosion, localized corrosion, and environmentally assisted crack growth under conditions of stress corrosion and corrosion fatigue. Extensive polarization, immersion, and galvanic-coupling experiments were conducted to determine effectiveness. A borax-nitrite-based inhibitor containing small additions of nitrate, silicate, phosphate, and mercaptobenzothiazole was found to provide excellent corrosion protection for high strength aluminum and steel alloys used in aerospace applications and for copper-bearing alloys used in electronic components and in parts of the Rinse Facility. Envionmental effects upon crack-growth rates of aluminum and high strength steel alloys were eliminated, reducing the rates in corrosion fatigue as compared to those obtained in air. A test program using these inhibitors is described. Tracking of maintenance costs and corrosion damage in being conducted to determine the effectiveness of the inhibited rinse in reducing corrosion costs. M.D.K.

N82-17363# Naval Air Development Center, Warminster, Pa.
CORROSION IN NAVAL AIRCRAFT ELECTRONIC SYSTEMS
Irving S. Shaffer *In* AGARD Aircraft Corrosion Aug. 1981 12 p refs (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

Naval aircraft electronic equipment suffer frequently from the effects of moisture and corrosion. The critical design features which have led to excessive susceptibility to these failure modes are described. Several examples are cited of inadequately protected equipment located in aircraft installations where they were subjected to repeated moisture intrusion during rainstorms, low level flights over water and high pressure fresh water washdowns. The specific deterioration effects that occurred on the various components that make up the avionic systems are presented. Maintenance data summaries are included to denote further the corrosion problem severity. Corrective measures in design, testing and maintenance are also discussed. Author

N82-17364# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
CORROSION PROTECTION SCHEMES FOR AIRCRAFT STRUCTURES: SOME EXAMPLES FOR THE CORROSION BEHAVIOUR OF Al ALLOYS
Henri Lajain *In* AGARD Aircraft Corrosion Aug. 1981 16 p (For primary document see N82-17349 08-26)
Avail: NTIS HC A09/MF A01

A summary of the main groups of aircraft surface protection procedures frequently applied is presented. In addition, some examples are given on the corrosive behavior of aluminum alloys. Information is also given on novel nondestructive test methods serving to recognize corrosion within the scope of aircraft maintenance. The following requirements which must be imposed with regard to the performance and quality of the surface protection are considered and discussed: (1) the potential differences of the materials used are to be kept as low as possible, i.e., constructive measures must be taken; (2) prevention of any local element activity by providing insulating protective coatings, i.e., by preventing a current; (3) inhibition by providing cover layers (e.g., chromate passivation); and (4) introducing layers which act as so-called sacrificial anodes. M.D.K.

N82-17365 Carnegie-Mellon Univ., Pittsburgh, Pa.
PERTURBED ANGULAR CORRELATION STUDIES OF ELECTRIC FIELD GRADIENTS IN METALLOPORPHYRINS Ph.D. Thesis
Oliver Clinton Mullins 1981 168 p
Avail: Univ. Microfilms Order No. 8127358

Electric field gradients (EFG) at the metal center were studied in seven chloroindium porphyrin complexes and in chloroindium phthalocyanine by the technique of perturbed angular correlation of gamma rays. These complexes were synthesized with the probe nucleus -111 In for use in polycrystalline and solution sources. The magnitudes of the EFG's of the metalloporphyrins span a wide range and are shown to correlate with the electron donating properties of the peripheral substituents. Electron withdrawing properties were observed in the phthalocyanine ring. This large EFG is attributed to the diminished cavity size of the phthalocyanine. All porphyrin complexes were characterized by the large chemical inhomogeneities. The deformable nature of the porphyrin macrocycle in contrast to the relatively planar, inflexible structure of the phthalocyanine was observed. The PCA spectra of metalloporphyrins dissolved in organic solvents were characterized and analyzed. Dissert. Abstr.

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-17366 Illinois Univ. at Urbana-Champaign.
POLYMER COATED ELECTRODES AS MICROELECTRO-

CHEMICAL MEDIA Ph.D. Thesis
Nancy Linden Good 1981 121 p
Avail: Univ. Microfilms Order No. 8127598

Gold film electrodes were coated with polymer films less than 1000 A thick; then electrochemistry was done on samples absorbed into the film from solution. Detailed studies of potassium ferricyanide in a poly(4-vinyl pyridine) film showed that cyclic voltammetry can be done successfully with this system. The performance of the electrode was measured. The cationic polyelectrolyte is selective favoring multiply charged anions. Very roughly, 10% of the pyridine groups of the polymer are associated with a ferricyanide ion. Monitoring the cyclic voltammograms as the pH of the solution is varied from 7 to 1 lead to some knowledge of the environment within the film. At low pH near-theoretical peak shapes for reactants and products bound to electrode surfaces were observed. The structure of the film did not appear to retard mass transport on the timescale of the experiments, with 50 mV/sec scan rates. Preliminary work with providing multiple identical electrodes on a single glass slide was done, and future applications to analytical chemistry are discussed. Dissert. Abstr.

N82-17367*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
IMPROVED TACK PMR
R. A. Buyny Oct. 1981 108 p refs
(Contract NAS3-22026)
(NASA-CR-165432; TRW-36805-6016-UT-00) Avail: NTIS HC A06/MF A01 CSCL 07C

One reactive diluent and several high boiling solvents were investigated for providing long shelf life tack and drape to PMR polyimide prepreg materials. The most promising approach was to introduce dimethoxy ethyl ether (diglyme) to the normal methanol solvent. Compression and autoclave molding cycles were developed for the improved tack prepreg which provided up to 15% higher thermomechanical properties than conventional PMR-15 composites. Near the conclusion of this investigation, it was discovered that diglyme constituted a potential hazard because its auto ignition temperature is 464 K. Consequently, it was recommended that diglyme should not be used as a tackifier for PMR prepregs. Author

N82-17368# National Aerospace Lab., Tokyo (Japan).
STRENGTH EVALUATION TEST OF PRESSURELESS-SINTERED SiC AND REACTION-SINTERED SiSUB3NSUB4 AT ROOM TEMPERATURE
Katsutoshi Matsusue, Kitao Takahara, and Ryosaku Hashimoto Aug. 1981 19 p refs In JAPANESE; ENGLISH summary
(NAL-TR-678; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Strength characteristics were studied at room temperature. The strength evaluating-method of ceramic materials, bending-tests of bars, tensile tests of rectangular plates, spin-tests of inner-peripherally notched disks, and diametrical compression tests of centrally holed disks were conducted on pressureless-sintered silicon carbide and reaction-sintered silicon nitride specimens. The relationship between the mean strength of specimens and effective volume or effective area of specimens was examined using Weibull's theory. Author

N82-17369# Reluxtrol Co., San Francisco, Calif.
DEFECT DETECTION AND IDENTIFICATION IN Si3N4 AND SiC USING CONTROLLED RELUCTANCE ELECTROMAGNETIC TEST METHODS Final Report, Dec. 1980 - Sep. 1981
Duane P. Johnson and E Kim Kietzman Watertown, Mass. AMMRC Oct. 1981 56 p
(Contract DAAG46-80-C-0095)
(AD-A107726; Rept-440-159; AMMRC-TR-81-52) Avail: NTIS HC A04/MF A01 CSCL 11/2

This test studied the feasibility of defect detection in Si3N4 and SiC using high frequency (32 MHz) electromagnetic techniques and focused field CREG test probes. Examined were test specimens which contained near surface defects - hardness indentation induced cracks, scratches, pits, and inclusions. While unable to detect cracks in the test pieces, it successfully demonstrated the ability to detect certain other defects - 19 microns high scratches in SiC, for example. Also observed were variations in electromagnetic signals which seemed to reflect variations in electrical and dielectrical properties of the test pieces, possibly due to variation in specimen microstructures and/or chemistry. GRA

N82-17370# Massachusetts Univ., Amherst. Dept. of Polymer Science and Engineering.
ELECTRON PARAMAGNETIC RESONANCE SATURATION CHARACTERISTICS OF PRISTINE AND DOPED POLYACETYLENES Interim Technical Report
James C. W. Chien, Gary E. Wnek, Frank E. Karasz, John M. Warakomski, L. Charles Dickinson, A. C. MacDiarmid (Pennsylvania Univ.), and A. J. Heeger (Pennsylvania Univ.) 11 Nov. 1981 55 p refs
(Contract N00014-81-K-0648)
(AD-A107716; TR-81-14; NR-356-602-4-13-91) Avail: NTIS HC A04/MF A01 CSCL 20/3

Electron paramagnetic resonance saturation experiments have been carried out on undoped polyacetylene and in the doped polymer as a function of dopant concentration. The relaxation times of undoped trans- (CH)x show considerable variability from sample, T1 = (2.7 + or - 1.7) x 10 to the -5 sec and T2 = (7.8 + or - 1.0) x 10 to the -8 sec suggesting sensitivity to trace impurities. Exposure to air reduces T1 to 8.1 x 10 to the -6 sec and T2 to 6.6 x 10 to the -8 sec; this effect is reversible. Using radio-assay techniques with 125 sub I, it was possible to prepare and characterize samples of known dopant concentration at the level of parts per million (ppm). There are three distinct regimes which characterize the effect of iodine concentration on the EPR characteristics of trans-(CHIy)x. GRA

N82-17371# Southwest Research Inst., San Antonio, Tex.
COMPRESSIVE STRENGTH AND DAMAGE MECHANISMS IN CERAMIC MATERIALS. 1: THE ROLE OF SUBCRITICAL TENSILE MICROFRACTURE PROCESSES IN COMPRESSION FAILURE OF CERAMICS. 2: ELECTRON CHANNELING STUDY OF FRACTURE IN ALUMINA - EVIDENCE FOR CRACK TIP PLASTICITY Interim Technical Report, 1 Sep. 1980 - 30 Sep. 1981
James Lankford and David L. Davidson Sep. 1981 35 p refs
(Contract N00014-75-C-0668; NR Proj. 032-553; SwRI Proj. 02-4231)
(AD-A107617) Avail: NTIS HC A03/MF A01 CSCL 11/2

The compressive strength of SiC, Si3N4, and Al2O3 was investigated over wide ranges in temperature and loading rate. Several distinct damage regimes were identified, all based upon tensile microfracture processes. Two aspects of the work are of special interest. The first is the identification of a high strain rate regime in which material inertial effects are responsible for unusually rapid strengthening; the basis for the effect is increased difficulty in either crack nucleation or extension. Secondly, it is found that at low loading rates, subcritical tensile microcrack growth is responsible for a thermally activated strength dependence. Selected area electron channeling experiments lead to the conclusion that the thermal activation process may involve crack tip plasticity. Author (GRA)

N82-17372# Materials Research Labs., Ascot Vale (Australia).
SYNTHESIS OF FUNGICIDAL VINYL AND ACRYLIC LATICES BY EMULSION POLYMERIZATION
L. V. Wake Jul. 1981 19 p refs
(AD-A107848; MRL-R-822; AR-002-424) Avail: NTIS HC A02/MF A01 CSCL 11/3

Latex emulsions were prepared in which experimental fungicidal compounds were copolymerized into the resin matrix. The latices were laboratory tested for antifungal activity and subsequently formulated as internal/external paints. The paints were exposed under tropical conditions for evaluation of long-term growth-free performance. The monomers pentachlorophenyl acrylate (PPA) and pentachlorophenyl methacrylate (PPMA) were synthesized and incorporated into latices by emulsion polymerization at various levels in the general vicinity of 2% w/w and 3% w/w. Emulsion copolymers were prepared by combining various mixtures of vinyl acetate, methyl methacrylate, methacrylic acid, ethyl and butyl acrylates with the experimental monomers. By

appropriate formulation, stable fine-particle emulsions were prepared exhibiting both antifungal activity and suitable film-forming properties. Author (GRA)

N82-17373# Martin Marietta Corp., Baltimore, Md.
EFFECTS OF SURFACE MORPHOLOGY AND CHEMICAL COMPOSITION ON THE DURABILITY OF ADHESIVELY BONDED ALUMINUM STRUCTURES Final Report
Tsishung Sun, Guy D. Davis, John D. Venables, and Jar-Mo Chen Oct. 1981 35 p refs
(Contract F49620-78-C-0097; AF Proj. 2303)
(AD-A107664; MML-TR-81-45C; AFOSR-81-0725TR) Avail: NTIS HC A03/MF A01 CSCL 11/3

The hydration of aluminum surfaces prepared for adhesive bonding by anodization in phosphoric acid was studied using surface behavior diagrams which trace the evolution of the aluminum adherend surface composition, obtained by X-ray photoelectron spectroscopy. When supplemented with high resolution scanning electron micrographs and Auger depth profiles, the surface behavior diagrams show that hydration proceeds in three steps. The first is reversible and consists of the adsorption of water by the monolayer of A/PO4 initially present on the surface with no change in the oxide morphology. The second, which appears to be rate controlling, involves slow dissolution of the phosphate followed by rapid hydration of the exposed aluminae to the oxyhydroxide, boehmite. Extensive morphological changes occur as the boehmite fills the pore cells and bridges the whiskers of the original surface. The final step consists of the nucleation and growth of the trihydroxide, bayerite, on top of the boehmite. The surface behavior diagram approach is proposed as a new tool for the study of surface reactions in general. GRA

N82-17374# California Univ., Berkeley. Electronics Research Lab.
DEVELOPMENT OF HIGH SENSITIVITY X-RAY AND ELECTRON-BEAM RESIST PROCESSES Final Report, 15 Dec. 1979 - 14 Jun. 1981
D. W. Hess 20 Jul. 1981 15 p refs
(Grant AF-AFOSR-0078-80; AF Proj. 2306)
(AD-A107833; AFOSR-81-0729TR) Avail: NTIS HC A02/MF A01 CSCL 20/7

Plasma-initiated polymerization was used to form ultrahigh molecular weight (greater than ten million grams per mole) poly (methylmethacrylate) (UHMW PMMA) from liquid methyl methacrylate (MMA). The PMMA thus obtained was exposed to beams of 10 KV electrons ranging in dose from 0.1 - 10 micro-coulombs per square centimeter. For comparison, identical exposures were carried out using commercial PMMA resist (KTI) with a molecular weight of about 0.7 million grams/mole. Using 1:1 methyl ethyl ketone and isopropanol to develop the exposed resist, 0.5 micron pattern sizes were formed in both resist materials. Pattern fidelity in the UHMW PMMA was virtually identical to that obtained with KTI PMMA, but a factor of three lower dose could be used with the UHMW material. This lowered dose arose because the dissolution rate of the unexposed resist was a factor of 30 lower for UHMA than for KTI PMMA. A new spinner was designed and built to allow improved control of spin-cast films. Modeling studies based upon non-Newtonian behavior were initiated to enable prediction of film thickness as a function of position on a wafer, solution viscosity, and spin speed. In an attempt to further improve the sensitivity of UHMW materials, synthetic studies were undertaken to introduce halogen atoms into the MMA molecule. Chlorinated MMA was synthesized and is currently being investigated for its plasma-initiation susceptability. Author (GRA)

N82-17375# California Univ., Los Angeles. Dept. of Chemistry.
TEMPERATURE DEPENDENCE OF THE HOMOGENEOUS LINEWIDTH OF THE (D SUB 0)-5 - (F SUB 0)-7 TRANSITION OF Eu-3(+) IN AMORPHOUS HOSTS AT HIGH TEMPERATURES Interim Technical Report
Jack R. Morgan and Moftafa A. El-Sayed 20 Nov. 1981 16 p refs Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A107900; TR-38) Avail: NTIS HC A02/MF A01 CSCL 11/2

The temperature dependence of the homogeneous linewidth of the 5D sub 0 - 7F sub 0 transition of Eu(3+) in different amorphous solids is determined in the 295 K to 800 K temperature range. The nearly quadratic temperature dependence observed is discussed in terms of Raman broadening and mechanisms based on two-level systems known to exist in disordered systems. Author (GRA)

N82-17376# Northrop Corp., Hawthorne, Calif. Aircraft Div.
ADHESIVES FOR FIELD REPAIR OF GRAPHITE/EPOXY COMPOSITE STRUCTURES Final Report, Sep. 1980 - Aug. 1981
David J. Crabtree Nov. 1981 61 p
(Contract N62269-80-C-0250)
(AD-A107870; NOR-81-161; NADC-79286-60) Avail: NTIS HC A04/MF A01 CSCL 11/4

Adhesive formulations were developed for the repair of damaged graphite/epoxy structures on board ship. These adhesives are two-part paste adhesives which can be cured at contact pressure at temperatures as high as 149C (300F). The adhesives were formulated from epoxy resins toughened by prereaction with carboxyl terminated butadiene acrylonitrile rubbers. Amine curing agents were used. An adhesive formulated from the reaction product of Epon 828 epoxy resin (Shell Chemical Co.) and CTBN 1300X8 (B. F. Goodrich) using PACM-20 amine curing agent (Du Pont) had lap shear strengths at -55C (-67F) and room temperature of approximately 5000 psi. At 115C (220F) the lap shear strength was approximately 2800 psi. These values are competitive with the highest quality film adhesives. The environmental durability was impressive. Lap shear specimens after exposure to 140F, 95% RH under a constant tensile stress of 1000 psi for 21 days and for 60 days under a stress of 500 psi showed only a 2 percent and an 11 percent reduction, respectively, in ultimate tensile shear strength compared to unexposed control specimens when tested to failure at 115C (220F). Author (GRA)

N82-17377# Swedlow, Inc., Garden Grove, Calif.
TRANSPARENT POLYOLEFIN FILM ARMOR Final Report, 30 Mar. 1976 - 28 Feb. 1981
Ralph Shelton Watertown, Mass. AMMRC Aug. 1981 264 p refs
(Contract DAAG46-76-C-0034)
(AD-A107562; SI-ER-1001; AMMRC-TR-81-41) Avail: NTIS HC A12/MF A01 CSCL 19/4

The general objective of this project was to determine the optimum processing conditions for the large scale conversion, by molding and laminating of oriented polyolefin film into fragment resistant transparent armor suitable for Army aircraft glazing applications. The manufacturing process must produce a laminate with sufficient adhesion to resist debonding during thermal cycling and yet react as a laminar structure during ballistic impact. Author (GRA)

N82-17378# National Bureau of Standards, Washington, D.C. Polymer Science and Standards Div.
CRYSTALLINE FORMS IN A COPOLYMER OF VINYLIDENE FLUORIDE AND TRIFLUOROETHYLENE (52/48 MOL %)
Andrew J. Lovinger, G. T. Davis, T. Furukawa, and M. G. Broadhurst Nov. 1981 31 p refs Submitted for publication
(Contract N00014-79-F-0012)
(AD-A107809; TR-16) Avail: NTIS HC A03/MF A01 CSCL 20/2

The structure of 52/48 mol % copolymer of vinylidene fluoride and trifluoroethylene has been investigated at various temperatures by X-ray diffraction. Melt-solidified samples consist of a mixture of two disordered crystalline phases, one trans-planar, the other 3/1-helical. Samples may be transformed to either phase by appropriate means to reveal a hexagonal (or pseudo-hexagonal) molecular packing. The all-trans phase may be obtained by drawing or poling at low temperatures; both treatments cause a transformation of the disordered mixture of phases into a well-ordered planar zig-zag phase. Isolation of the disordered 3/1-helical phase is achieved by heating to high temperatures, where-upon all samples, irrespective of orientation or polarization, undergo transformation to a poorly ordered helical structure analogous to that of trifluoroethylene homopolymer; upon cooling,

the original, disordered mixture of phases is recovered.
Author (GRA)

N82-17379# National Bureau of Standards, Washington, D.C. Polymer Science and Standards Div.
STRUCTURAL AND DIELECTRIC INVESTIGATION ON THE NATURE OF THE TRANSITION IN A COPOLYMER OF VINYLIDENE FLOURIDE AND TRIFLUOROETHYLENE (54/48 MOL %)
G. T. Davis, T. Furukawa, A. J. Lovinger, and M. G. Broadhurst Nov. 1981 32 p refs Submitted for publication
(Contract N00014-79-F-0012)
(AD-A107846; TR-17) Avail: NTIS HC A03/MF A01 CSCL 11/9

The effect of temperature on the structure and dielectric properties of a copolymer of vinylidene chluoride and trifluoroethylene was investigated at temperatures up to 140 C. Undrawn or unpoled specimens contain an intimate mixture of two disordered crystalline phases, both of which undergo a large increase in d-spacing at 65-70 C, with eventual transformation to a single phase in which the chains assume a disordered 3/1-helical conformation above 90 C. The 70 C transition is accompanied by a dielectric anomaly. The changes in crystal phase and dipole orientation upon poling result in a reduction of the dielectric constant at room temperature, a shift of the dielectric anomaly to about 80 C, stability of the all-trans crystal phase to somewhat higher temperatures, and a discrete change in d-spacing at the transition region. Loss of polarization at this ferroelectric-to-paraelectric transition is attributable primarily to the molecular change from the polar all-trans conformation to its non-polar, disordered 3/1-helical counterpart. Rotational dipolar motions also lead to the dielectric anomaly. GRA

N82-17380# National Bureau of Standards, Washington, D.C. Fracture and Deformation Div.
STRESS CORROSION OF CERAMIC MATERIALS Annual Report, 1 Oct. 1980 - 30 Sep. 1981
Stephen W. Freiman, Terry A. Michalske, R. C. Pohanka, K. Okazaki, S. Tashiro, C. J. Simmons, P. N. Krishnan, and G. E. Walrafen Oct. 1981 56 p refs
(Contract N00014-79-F-0030; RR0220201)
(AD-A108045) Avail: NTIS HC A04/MF A01 CSCL 11/2

The results of an experimental program to investigate mechanisms of stress corrosion in glasses and ceramics and to determine effects of composition and microstructure on the fracture of piezoelectric materials. One of the main reasons for strength degradation of structural ceramic materials is stress corrosion cracking. Caused mainly by water in the environment, stress corrosion cracking results in subcritical crack growth that leads to delayed failure of ceramic materials. As a consequence of this crack growth, ceramic components that are subjected to external stresses are liable to fail after an indeterminate period of time, leading to a considerable uncertainty in the safe design stress. One of the objectives of modern ceramics technology is to reduce the uncertainty associated with structural design, and hence, to improve our capabilities of designing ceramic components that exhibit reliable mechanical behavior. This objective can be accomplished in part through a better understanding of the fundamental processes that occur during stress corrosion cracking. GRA

N82-17381# National Bureau of Standards, Washington, D.C. Lab. for the Structure of Matter.
NEW ENERGETIC MATERIALS. STRUCTURAL CHARACTERIZATION Annual Report, 1 Oct. 1980 - 30 Sep. 1981
Richard Gilardi, Clifford F. George, and Jerome Karle 15 Oct. 1981 38 p refs
(AD-A107714; LSM-81-1) Avail: NTIS HC A03/MF A01 CSCL 07/4

The molecular structures of five new materials developed in ONR-sponsored explosive/propellant research are reported. The material 3,3-bis-azidomethyl oxetane (BAMO) was studied in three different forms. Using gas electron diffraction analysis, the molecular structure of the monomer of BAMO in the vapor phase was determined. A cyclic tetramer of BAMO was characterized with X-ray single-crystal diffraction analysis. Finally, a linear polymer of BAMO was studied as a semi-crystalline fiber using X-rays. Most of the features of the polymer molecular structure were determined from the fiber diffraction pattern. The crystal and molecular structure of a tetra-nitro compound, 4,7-bis-dinitrofluoromethyl-1,3-dioxepane, is reported; this compound is a newly synthesized monomer developed during research on the synthesis of nitro-polymers. The crystal and molecular structure of bis(5-amino-1,2,4-oxadiazole) is also reported. It is an unusually stable synthetic intermediate obtained in research aimed at producing new types of high-density nitro-explosives.
Author (GRA)

N82-17382# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS): VOLUME 1: PLASTIC MATERIALS (APPENDIX 1, PLASTIFICATION SYSTEMS) [PROSPECTIVE MATIERES PLASTIQUES - ELASTOMERES - PEINTURES. ANNEXE 1: SYSTEMES DE PLASTIFICATION]
C. Bord 1 Jul. 1981 67 p refs In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-1) Avail: NTIS HC A04/MF A01

Plastification systems were studied bibliographically and possible developments in the geometrical and mechanical design of the systems were researched. Rheology of screw in sleeve feed systems for plastic and elastomer materials is explained. Metallurgical research is necessary in order to improve corrosion and abrasion resistance of screw and sleeve machine parts. The rheology of injection plastification systems is of special importance since this process dominates the industry. Author (ESA)

N82-17383# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 2: PLASTIC MATERIALS (ASSESSMENT AND EVOLUTION OF APPLICATIONS OF PLASTIC MATERIALS FOR MECHANICAL CONSTRUCTIONS) [PROSPECTIVES MATIERES PLASTIQUES - ELASTOMERES-PEINTURES. ETAT ET EVOLUTION DES APPLICATIONS DES MATIERES PLASTIQUES AUX PRODUITS MECANIQUES]
C. Bord 1 Jul. 1981 272 p In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-2) Avail: NTIS HC A12/MF A01

The use of thermoplastics and thermosetting composites in a wide variety of manufacturing processes is reviewed. Different materials and methods of forming are covered. Characteristics of the various plastic materials are illustrated by the functional design of the products of which they are a part. Prospective applications are cited while innovations and development trends are identified. Author (ESA)

N82-17384# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 3: PLASTIC MATERIALS (APPENDIX 3, COMPUTER ASSISTED DESIGN APPROACH TO INJECTION MOLDS) [PROSPECTIVES MATIERES PLASTIQUES - ELASTOMERES-PEINTURES. ANNEXE 3: APPROCHE DE LA CAO DES MOULES D'INJECTION]
C. Bord and M. Brierre 1 Jul. 1981 181 p refs Partly in FRENCH, GERMAN and ENGLISH 6 Vol.
(CETIM-12-B-194-Vol-3) Avail: NTIS HC A09/MF A01

Five different calculation methods, either for laboratory analysis or industrial application, which permit the modeling of plastic materials flow conditions in injection molding equipment are presented. Two of the methods are sufficiently developed to allow for computerized application in tooling design. The methods cover (1) optimization of molds, (2) description of a computer aided injection molding system, (3) better economy in injection molding through optimum equipment design, (4) the Moldflow system, and (5) calculation of the cavity wall thickness in molds for injection molding of plastomers. Author (ESA)

N82-17385# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 4: PLASTIC MATERIALS (APPENDIX 2, AUTOMATION AND EVOLUTION OF EQUIPMENT FOR FORMING PLASTIC MATERIALS) [PROSPECTIVE MATIERES PLASTIQUES - ELASTOMERES-PEINTURES. ANNEXE 2: AUTOMISATION ET EVOLUTION

DES EQUIPMENTS DE MISE EN OEUVRE DES MP]
M. Brierre 1 Jul. 1981 44 p refs In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-4) Avail: NTIS HC A03/MF A01

The impact of numerical control on plastics forming techniques is assessed. The automation of injection presses, mainly through application of microprocessors and digital techniques, is discussed. With hydraulic presses, considerable energy savings are realized through automation. The use of industrial robots is also mentioned and illustrated. Other equipment whose design and operation are influenced by the use of electronics are thermoplastic injection molds, screw in sleeve feeders, and extrusion machines. Author (ESA)

N82-17386# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 5: PAINTS [PROSPECTIVE MATIERES PLASTIQUES ELASTOMERES. VOLUME 5: PEINTURES]
D. Jahier 1 Jul. 1981 23 p In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-5) Avail: NTIS HC A02/MF A01

Four different kinds of paint are discussed: (1) solvent base, (2) high solids, (3) powder, and (4) water base. The relative frequency of use of each paint type in industry is considered and trends due to environmental (pollution control legislation) and economic factors are shown. The four paint types are characterized and their properties are listed. Painting processes are also considered and the applicability of the different paints is determined. Author (ESA)

N82-17387# Centre Technique des Industries Mecaniques, Nantes (France).
PROSPECTS FOR MATERIALS (PLASTICS, ELASTOMERS, PAINTS). VOLUME 6: ELASTOMERS [PROSPECTIVE MATIERES PLASTIQUES ELASTOMERES PEINTURES. VOLUME 6: ELASTOMERES]
D. Jahier 10 Jul. 1981 17 p refs In FRENCH 6 Vol.
(CETIM-12-B-194-Vol-6) Avail: NTIS HC A02/MF A01

Development of elastomer materials, production processes, and applications are forecast for the short-term. Thermoplastic elastomers are of particular interest due to good mechanical properties. The processing of thermosetting rubber is described. A continuing tendency to substitute elastomers where natural rubber has been used (tires, insulation, seals, etc.) is foreseen. Author (ESA)

N82-17388# Sandia Labs., Albuquerque, N. Mex.
LOW TEMPERATURE BEHAVIOR OF EPOXY-RUBBER PARTICULATE COMPOSITES
S. C. Kunz and P. W. R. Beaumont 1981 36 p refs Prepared in cooperation with Cambridge Univ., England
(Contract DE-AC04-76DP-00789)
(PB82-113499; CUED/C-MATS/TR-75-1981;
ISSN-0309-6505) Avail: NTIS HC A03/MF A01 CSCL 11J

Toughness and mechanical property data are presented for a CTBN-rubber modified epoxy resin in the temperature range 20 C to -110 C. A toughening model based on the ultimate strain capability and tear energy dissipation of the rubber, present as dispersed microscopic particles in an epoxy matrix, is used to explain the suppression of composite toughness observed below -20 C. The toughness loss is attributed to a glass transition near -40 C in the epoxy resin which forms not only the primary matrix phase but also occlusions in the rubber particles themselves. On this basis a severe loss in ductility of the particles is anticipated which, along with reduced molecular mobility in the epoxy matrix, can account for an overall decrease in composite toughness. The low temperature data, used to test the particle stretching-tearing model for toughening, are found to be consistent with the proposed theory. GRA

N82-17389# Brown Univ., Providence, R. I.
BASIC RESEARCH ON MACROMOLECULAR DYNAMICS Annual Report, Jun. 1980 - May 1981
J. H. Weiner Jul. 1981 15 p refs
(Contract GRI-5080-363-0309)
(PB82-115502; GRI-80/0075) Avail: NTIS HC A02/MF A01 CSCL 07D

A computer program is used to simulate the thermal motion of long chain molecules in solution, and the role of coordination effects in this process is investigated. The computer simulation results agree qualitatively with experiments using fluorescence spectroscopy and show that the activation energy of the process is insensitive to the degree of coordination. Theoretical analysis and computer simulation also show remarkable differences in the thermomechanical behavior of rigid and flexible models for the stretched two bond, freely jointed chain. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

N82-17390 Defence Research Information Centre, Orpington (England).
EFFECTS ON SOLID-STATE REACTIONS DURING THERMAL DECOMPOSITION OF NITROCELLULOSE
K. M. Bucerius, N. Eisenreich, and A. Pfeil Oct. 1981 16 p refs Transl. into ENGLISH from Int. Jahrestag - Fraunhofer-Inst. fuer Trieb- und Explosivstoffe (ICT) (W. Germany), no. 7-29, 1979 p 331-344
(DRIC-T-6460; BR80787) Copyright. Avail: Issuing Activity

The influence of solid state reactions on the burning rate of modified double base solid rocket propellants was investigated. Solid phase pyrolosis was observed in an optical bomb. The decomposition reaction was thermoanalyzed and pyrolosis residues were analyzed. Carbonaceous fibers are produced by modifier effects in the solid material below the burn off surface. The thermal decomposition of nitrocellulose is accelerated by close contact with combustion modifiers, which also oxidize charcoal-like products formed during this decomposition. A direct bond of modifiers to nitrocellulose withstands solvents. The bond produces a good degree of distribution at smaller outlay than other methods. Author (ESA)

N82-17391# Buderus A.G., Wetzlar (West Germany).
PROMOTION OF UTILIZING PRIMARY ENERGY AND REDUCTION OF EMISSION WITH GRATE-EQUIPPED HEAT GENERATORS FIRED COMPLETELY AUTOMATIC WITH SOLID FUELS Final Report, Dec. 1980
Eberhard Nickel and Guenter Hoefeld Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 181 p refs Sponsored by Bundesministerium fuer Forschung un Technologie
(BMFT-FB-T-81-222; ISSN-0340-7608) Avail: NTIS HC A09/MF A01

The development of two automatic boiler systems for the combustion of anthracite and crushed coke is described. The systems differ in their output range and in the type of grate used. Both systems allow the substitution of coke or coal for fuel oil. Maintenance facilities and boiler efficiency are considered. J.D.H.

N82-17392# General Accounting Office, Washington, D. C.
DOE'S ALCOHOL FUELS AWARDS PROCESS RESULTED IN QUESTIONABLE AWARD SELECTIONS AND LIMITED SMALL BUSINESS SUCCESS
21 Aug. 1981 32 p refs
(AD-A106665; GAO/EMD-81-125) Avail: NTIS HC A03/MF A01 CSCL 21/4

The selection process used to make alcohol fuels feasibility study grants and cooperative agreement awards is reviewed. The criteria and process used to evaluate proposals and make award selections and the extent to which awards were made to large and small businesses are evaluated. Recommendations for improving the awards process are presented. DOE

N82-17393# SRI International Corp., Menlo Park, Calif.
STUDY OF FUNDAMENTAL CHEMICAL PROCESSES IN EXPLOSIVE DECOMPOSITION BY LASER-POWERED HOMOGENEOUS PYROLYSIS Final Report, 1 Jul. 1978 - 31 Aug. 1981
Donald F. McMillen and David M. Golden 12 Nov. 1981 64 p refs

(Contract DAAG29-78-C-0026; SRI Proj. PYU-7399)
(AD-A108022; SRI-7399; ARO-15591.2-C) Avail: NTIS HC A06/MF A01 CSCL 19/1

Very Low-Pressure Pyrolysis studies of 2,4-dinitrotoluene decomposition resulted in decomposition rates consistent with log (ks) = 12.1 43.9/2.3 RT. These results support the conclusion that previously reported 'anomalously' low Arrhenius parameters for the homogeneous gas-phase decomposition of ortho-nitrotoluene actually represent surface-catalyzed reactions. Preliminary qualitative results for pyrolysis of ortho-nitrotouene in the absence of hot reactor walls, using the Laser-Powered Homogeneous Pyrolysis technique (LPHP), provide further support for this conclusion: only products resulting from Ph-NO2 bond scission were observed; no products indicating complex intramolecular oxidation-reduction or elimination processes could be detected. The LPHP technique was successfully modified to use a pulsed laser and a heated flow system, so that the technique becomes suitable for study of surface-sensitive, low vapor pressure substrates such as TNT. The validity and accuracy of the technique was demonstrated by applying it to the decomposition of substances whose Arrhenius parameters for decomposition were already well known. IR-fluorescence measurements show that the temperature-space-time behavior under the present LPHP conditions is in agreement with expectations and with requirements which must be met if the method is to have quantitative validity. LPHP studies of azoisopropane decomposition, chosen as a radical-forming test reaction, show the accepted literature parameters to be substantially in error and indicate that the correct values are in all probability much closer to those measured in this work: log (k/s) = 13.9 - 41.2/2.3 RT. GRA

N82-17394# Pittsburg Energy Technology Center, Pa.
TRANSPORT CHARACTERISTICS OF ALTERNATE SLURRY FUELS Quarterly Technical Progress Report, Jul. - Sep. 1981
1981 9 p refs
(DE82-003019; DOE/TIC-2003019) Avail: NTIS HC A02/MF A01

Flow data for various alternate fuels, such as coal/water mixtures is obtained, in a pump loop which accurately simulates fuel feed systems found in boiler and furnace applications. Measurement and correlation of pressure loss as a function of slurry characteristics and system design is emphasized. Construction of a one inch loop was completed. Pressure transducers, thermocouples and a mass flow meter were installed and linked to a data acquisition system. A series of preliminary tests was conducted with flowing water, 60%, 63%, and 65% coal water mixtures. The bulk of the CWM's contained and additive, Lomar-D, at a dosage of approximately .5% by total mix weight. These tests were conducted primarily to evaluate the design of the loop, the adequacy of the instrumentation and the reproducibility of the CWM preparation method. The design of the loop is sound. DOE

N82-17395# Kimball (L. Robert) and Associates, Ebensburg, Pa.
BRIQUETTING OF FINE COAL USING A SODIUM CHLORIDE BINDER Final Report
E. Y. Crossmore, Jr., R. J. Kimball, and S. M. Kimball Oct. 1981 41 p refs
(Contract DE-AC01-79ET-14303)
(DE82-000632; DOE/ET-14303/T1) Avail: NTIS HC A03/MF A01

The economic and technological feasibility of producing dense, weather resistant briquettes from fine particulate bituminous coal was demonstrated. The binder consists of a sodium chloride dendritic crystalline matrix. The proclivity for liberation of pyritic sulfur and ash from fine coal particles for precombustion Deep Cleaning was investigated, in efforts to comply with clean air standards. Process technology as to coal beneficiation produces fine sized particles and handling the material after treatment is problematic. Reconstitution of this fine particulate was studied. Briquettes were produced which are equivalent to lump natural coal. Their heat value is greater as they contain less moisture and subjective burn tests for the product show a fouling index increase range. DOE

N82-17396# Spectron Development Labs., Inc., Costa Mesa, Calif.
EXPERIMENTAL INVESTIGATION OF SYNFUEL SPRAY CHARACTERISTICS AND COMBUSTION DYNAMICS Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
Jul. 1981 80 p refs
(Contract DE-AC22-80PC-30299)
(DE82-000412; DOE/PC-30299/T4; SDL-81-2176-180) Avail: NTIS HC A05/MF A01

Fundamental information on the characteristics and behavior of both petroleum based oils and synthetic fuels in spray combustion was sought by applying advanced optical diagnostic techniques to study the processes of fuel injection and atomization, droplet ignition, and spray combustion. The program was conducted in three phases: cold flow spray experiments; monodispersed droplet combustion; and spray combustion experiments. Parametric testing of all candidate injectors with number 2 fuel oil was completed. Efforts on spray characterization study were limited to completion of the final design of the traverse system for the droplet sizing interferometry (DSI). Detailed design of the monodisperse droplet combustion was completed. M.D.K.

N82-17397# American Farmers' Marketing Cooperative, Mayfield, Ky. Ethanol Div.
FEASIBILITY STUDY FOR ALTERNATIVE FUELS PRODUCTION: BIOMASS TECHNOLOGY. VOLUME 2: ADDENDUM, ECONOMIC AND FINANCIAL ANALYSIS
15 Dec. 1980 198 p refs
(Contract DE-FG07-80RA-50333)
(DE82-000030; DOE/RA-50333/T1-Vol-2) Avail: NTIS HC A9/MF A01

The feasibility of constructing and operating a motor-fuel ethanol plant is investigated. Detailed results are presented. The results of site surveys and area surveys are presented. Site preparation plans are outlined. Energy and material balances and equipment requirements are established as a part of the overall procedure to validate costs. Process flow sheets are included. Detailed diagrams of the plant design are also included. The management plan for the operation of the plant is discussed. DOE

N82-17398# Fluor Engineers and Constructors, Inc., Irvine, Calif.
COAL-TO-METHANOL: AN ENGINEERING EVALUATION OF TEXACO GASIFICATION AND ICI METHANOL-SYNTHESIS ROUTE Final Report
P. A. Buckingham, D. D. Cobb, A. A. Leavitt, and W. G. Snyder Aug. 1981 126 p refs
(DE81-904235; EPRI-AP-1962) Avail: NTIS HC A07/MF A01

Results of a technical and economic evaluation of producing methanol from bituminous coal using Texaco coal gasification and ICI methanol synthesis is reported. The scope of work included: development of an overall configuration for a large plant comprising coal preparation, air separation, coal gasification, shift conversion, COS hydrolysis, acid gas removal, methanol synthesis, methanol refining, and all required utility systems and off-site facilities. Design data were received from both Texaco and ICI while a design and cost estimate were received from Lotepro covering the Rectisol acid gas removal unit. The plant processes 14,448 tons per day (dry basis) of Illinois No. 6 bituminous coal and produces 10,927 tons per day of fuel-grade methanol. An overall thermal efficiency of 57.86 percent was calculated on an HHV basis and 52.64 percent based on LHV. Total plant investment at an Illinois plant site was estimated to be $1159 million dollars in terms of 1979 investment. Using EPRI's economic premises, the first-year product costs were calculated to $4.74 per million Btu (HHV) which is equivalent to $30.3 cents per gallon and $5.37 per million Btu. DOE

N82-17399# Hydrocarbon Research, Inc., Lawrenceville, N. J.
H-COAL PROCESS IMPROVEMENT STUDY: BENCH-UNIT BASELINE RUN WITH PREHEATER/REACTOR
May 1981 57 p
(Contract DE-AC05-77ET-10152)
(DE82-002572; DOE/ET-10152/T2) Avail: NTIS HC A04/MF A01

The thermal dissolution of coal and its effects on the mechanism of coal liquefaction in an H-Coal system were

investigated. The two-state coal liquefaction system consists of a coal slurry preheater and a liquefaction reactor, a catalytic-hydrogenation-reactor. The preheater design and unit modifications are discussed. The objective of the run reported was to obtain baseline data with the preheater integrated in the bench unit system. Operating conditions and results are summarized and compared with those of previous bench runs without a preheater. The effect a preheater has on product yields and product quality was determined. Based on comparison data it is concluded that a preheater tends to increase heavy liquid yields with more residual oil and a higher proportion of heavy distillates in the distillate product. However, more experimental data at comparable operating conditions, with and without a preheater, are needed to confirm this observation. The experimental run closely simulated the conditions of another run which also included a preheater; however, product yields differed by as much as 6 w %. The higher slurry space velocities in the preheater for this run correspond to lower slurry residence times, which resulted in lower yields of lighter fractions than obtained in PDU Run 5. DOE

N82-17400# Cummins Engine Co., Inc., Columbus, Ohio.
SYNFUEL MODIFIED DIESEL Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
1981 16 p
(Contract DE-AC03-79ET-15450)
(DE82-002298; DOE/ET-15450/T18) Avail: NTIS HC A02/MF A01

A two-year program was proposed to test three diesel engines operating on coal-derived liquid fuels and compare the results with standard diesel fuel oil No. 2; namely: (1) prechamber diesel; (2) dual fuel diesel (direct injection); and (3) spark-assisted diesel engines. The three types of diesel engines tested were to be modified in three forms; (1) conventional water-cooled; (2) waterless-uncooled; and (3) adiabatic (uncooled). Only the conventional water-cooled prechamber diesel engine and the spark assisted prechamber diesel engine were studied. Subcontracts were let to test the prechamber diesel engine and the spark-assisted prechamber. The direct injection dual fuel engine test will be delayed until the second year of the contract. No engine modifications for waterless-uncooled and adiabatic uncooled are scheduled for the first year. The selected engine models were installed in the laboratory. Preliminary operation was made. Both subcontractors began to construct a particulate measuring system according to recommendations. DOE

N82-17401# Chevron Research Co., Richmond, Calif.
REFINING AND UPGRADING OF SYNFUELS FROM COAL AND OIL SHALES BY ADVANCED CATALYTIC PROCESSES Interim Report
R. F. Sullivan, D. J. ORear, and H. A. Frumkin Sep. 1981 319 p refs
(Contracts DE-AC22-76ET-10532; EF-76-C-01-2315)
(DE82-001127; DOE/ET-10532/T3; FE-2315-61; IR-5) Avail: NTIS HC A14/MF A01

Two coal syncrudes derived from Illinois No. 6 and Wyodak coals were refined in a extensive program which included pilot plant and laboratory studies. These studies demonstrated that advanced, commercial petroleum technology can be used to refine these syncrudes to gasoline, jet, diesel and heating fuels. The coal syncrudes have a low hydrogen content, compared to petroleum, and high concentrations of oxygen and nitrogen impurities. These syncrudes are a blend of two coal distillates boiling between C sub 5 and 680 F. Consequently, they contain no residual and have about 95% boiling in the gasoline or diesel fuel ranges. With these properties, an appropriate way to refine the syncrudes is by hydroprocessing. Hydroprocessing yields a volume of finished products which is almost equivalent to the original volume of syncrude. In addition, the heteroatoms are ultimately removed as sulfur and salable ammonia. The engineering studies provided estimates of the refining costs. DOE

N82-17402# Chevron Research Co., Richmond, Calif.
REFINING AND UPGRADING OF SYNFUELS FROM COAL AND OIL SHALES BY ADVANCED CATALYTIC PROCESSES Quarterly Report, Apr. - Jun. 1981
R. F. Sullivan and D. J. ORear Sep. 1981 35 p
(Contracts DE-AC22-76ET-10532; EF-76-C-01-2315)
(DE81-030849; DOE/ET-10532/T2) Avail: NTIS HC A03/MF A01

Samples of solvent refined coal 2 middle and heavy distillates were water-washed and blended for use in a study of the potential biological hazards of synthetic crudes. A pilot plant screening was started on the blended distillate. Syncrude derived from Big Brown Texas lignite was analyzed and hydrotreated in a pilot plant. Early results show that properties and response to hydrotreating of the syncrude are similar to the results found on H-coal and solvent refined coal 2 syncrudes. DOE

N82-17403# European Space Agency, Paris (France).
EVALUATION OF A PYROTECHNIC ACTUATOR CONCEPT BY MEANS OF THE PROBIT STATISTICAL METHOD. JUSTIFICATION OF THE CHOICE OF THIS METHOD; APPLICATION; EXAMPLES OF APPLICATION
C. Tarrieu Nov. 1981 47 p Transl. into ENGLISH of "Evaluation d'un Mecanisme Pyrotech. au Moyen de la Methode Statistique 'Des Probits'. Justification du Choix de Cette Methode. Mise en Oeuvre. Exemples d'Application" Rept. CNES-78/CT/PRT/SST/SE/72 CNES, Toulouse Original report in FRENCH previously announced as N81-20310
(ESA-TT-694; CNES-78/CT/PRT/SST/SE/72) Avail: NTIS HC A03/MF A01

An aging model and ignition tests are evaluated using the probits method. Results show that experimental reliability of pyrotechnic valves, a cable cutter, or any other pyromechanism can be determined to within a 90% confidence limit, given a minimum sampling of 25 units. Author (ESA)

N82-17404# Institute of Gas Technology, Chicago, Ill.
RAPID-RATE BITUMINOUS COAL GASIFICATION Final Report, Sep. 1978 - Dec. 1980
D. Q. Tran Aug. 1981 71 p refs
(Contract GRI-5011-322-0082)
(PB82-115478; GRI-79/0104) Avail: NTIS HC A04/MF A01 CSCL 21D

A free-fall, laminar-flow reactor capable of studying the devolatilization of caking coals was constructed. The unit can provide kinetic data as a function of several process variables, including temperature, pressure, residence time and reactive gas composition at temperatures to 1600 F and pressures to 1500 psig. The reactor system was used successfully to obtain devolatilization data for two caking coals, Illinois No. 6 and Pittsburgh No. 8. Limiting (maximum) yields of CO, CO2, H2O, and CH4 were obtained for these two coals, and correlations were developd to predict the yield of these species from the H/C and O/C ratio of the raw coal. Author (GRA)

N82-17405# General Electric Co., Philadelphia, Pa. Reentry Systems Div.
LAND BIOMASS PROGRAM Annual Report, Jan. - Dec. 1980
K. Jain Mar. 1981 132 p refs
(Contract GRI-5011-323-0159)
(PB82-117391; GRI-80/0030) Avail: NTIS HC A07/MF A01 CSCL 21D

Integrated processes including production, harvesting, and conversion, to produce methane from land based crops that are cost competitive on a commercial basis with alternative sources of energy were developed. Sixteen candidate species of woody and herbaceous biomass were selected based on their superior productivity, adaptability to varying conditions, digestibility, and other selection criteria. Field samples of these species grown under relatively managed or monitored conditions were collected and analyzed for chemical composition. The composition analyses were completed, and on selected species anaerobic digestion and thermal gasification tests were conducted to obtain methane yield data. A regional program plan was also developed on production of methane from biomass for the state of Florida. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-17406# Eureka Labs., Inc., Sacramento, Calif.
THERMALLY-INDUCED VENTILATION APPLICATIONS IN

ATRIA: A STATE-OF-THE-ART REPORT
S. K. Leung, D. B. Kazama, R. E. Pierson, H. Sobin, T. M. Tam, D. Trenschel, and M. F. Young 15 Oct. 1981 205 p refs
(Contract DE-AC03-80SF-11511)
(DE82-001086; DOE/SF-11511/T3) Avail: NTIS HC A10/MF A01

The state of the art of an overall passive cooling project is reported. The project of selecting atrium sites to investigate thermally induced heat transfer and ventilative cooling to collect experimental data from which to develop design guidelines, and to establish heat transfer and ventilation algorithms. Interest is in passive cooling of commercial buildings but passive cooling of residential structures is also considered. Passive heating functions are addressed. The information consists of five parts: (1) review of historical and world wide atria; (2) technical considerations of atria; (3) existing heat transfer and ventilation algorithms and computer programs to analyze the energy functions of an atrium; (4) identification of existing atria in the U.S.; and (5) information pertinent to atria. DOE

N82-17407# Michigan Univ., Ann Arbor. Architectural Research Lab.
SOLARIZATION/CONSERVATION TECHNOLOGY DEVELOPMENT FOR EXISTING HOUSING Progress Report
W. Oberdick 1 Jun. 1981 34 p
(Contract DE-FG02-80R5-10227)
(DE82-002175; DOE/R5-10227/2) Avail: NTIS HC A03/MF A01

The project objectives were to develop a method for evaluating existing residences for their energy solarization/conservation potential as well as carrying out the solarization/conservation work within context of the Community Development program; and to demonstrate appropriate methods of utilizing solar energy in existing Ann Arbor residences beyond that obtainable in a good conservation program. A general progress update is presented covering tasks related to community solarization/conservation characteristics and community system analysis and development. The process of selection and technical evaluation of houses for solarization/conservation project directed retrofit is described. A detailed report on the survey of utility data and a report on the solarization/conservation site audits are included. A detailed comparison of the audit data for both the audit and control group are appended. DOE

N82-17408# Virginia Highway and Transportation Research Council, Charlottesville.
ILLINOIS METHOD FOR THE DESIGN OF DENSE-GRADED EMULSION BASE MIXES Final Report
C. S. Hughes Jun. 1981 30 p refs
(PB82-103235; VHTRC-81-R53; FHWA/VA-81/R53) Avail: NTIS HC A03/MF A01 CSCL 13B

The practicality of the use of a basic test method was evaluated. The use of the Illinois equation for predicting trial asphalt content is described and the results of resilient modulus tests are given. A cure and soak procedure that can be used to expedite designs by the Illinois method is also described. GRA

N82-17409# Energy and Environmental Engineering, Inc., Cambridge, Mass.
INVESTIGATION OF IN-SITU GELATION TO CONTROL EMISSIONS FROM ABANDONED HAZARDOUS WASTE SITES Final Report
J. F. Porter 29 May 1981 97 p refs
(Grant NSF DAR-80-09895)
(PB82-103508; NSF/CEE-81032) Avail: NTIS HC A05/MF A01 CSCL 13B

Solutions containing nickel, cyanide, and phenol at concentrations normally expected in leachates from dump sites were permeated through soil, soil-polymer, and soil polymer ion exchange resins. The reduction in total mass flow of toxic species and the retention of toxic ions by the ion exchange resin of the soil polymer ion exchange matrix resin was determined. Results indicate that the leachate flows are reduced by an order of magnitude at approximately 10 percent polymer in soil by weight and to near zero flow at approximately 80 percent polymer in soil by weight. A continuous phase of the polymer in the soil polymer or soil polymer exchange resins matrix confirms a significant reduction in the mass flow of toxic ions dissolved in leachates. GRA

N82-17410# Upper Plains States Innovation Group, Bismarck, N. Dak.
UPGRADING UNPAVED ROADS: ROAD BASE STABILIZATION USING LIME AND FLY ASH
Jack Howley and Chris Wohlers Sep. 1981 54 p
(Grant NSF ISP-80-07661)
(PB82-103524) Avail: NTIS HC A04/MF A01 CSCL 13B

A cost-effective alternative to upgrading unpaved roads using asphalt which may cost $100,000 per mile is proposed. In lime-fly ash stabilization, road aggregate is thoroughly mixed with lime, fly ash and water to form a new road base to a depth of five or more inches; this new road base is then compacted and covered with a minimum asphaltic surface layer such as a double chip seal. Guidelines are given for evaluating whether road base stabilization using lime and fly ash (an in-expensive waste product of coal-burning power plants) is an economical alternative to asphalt in upgrading a particular road. Detailed guidelines are presented for estimating the cost of materials for a lime-flyash project as well as a description of the necessary construction and maintenance procedures. GRA

N82-17411# Midwest Research Inst., Raleigh, N.C. Emission Standards and Engineering Div.
ASSESSMENT AND CONTROL OF CHRYSOTILE ASBESTOS EMISSIONS FROM UNPAVED ROADS Final Report
Robert K. Serra and Michael A. Connor, Jr. May 1981 150 p refs
(Contract EPA-68-02-3059; ESED Proj. 7776)
(PB82-102526; EPA-450/3-81-006) Avail: NTIS HC A06/MF A01 CSCL 13C

The findings of field surveys and a test program to assess chrysotile asbestos emissions generated by vehicular use of unpaved roads surfaced with crushed serpentinite rock are presented. Included are discussions of Federal asbestos regulations, sampling and analysis procedures, human health effects, and various emission control techniques. The Enviromental Protection Agency believes that asbestos emissions which occur from unpaved roads and other dusty sources surfaced with serpentinite should be reduced to the greatest extent practical. Local, State, and Federal agencies responsible for road maintenance in the limited areas where asbestos emissions occur are in the best position to assess local conditions and implement the most appropriate control measures. GRA

N82-17412# New England River Basins Commission, Boston, Mass.
DREDGING MANAGEMENT: DATA AND ANALYSIS FOR THE NEW ENGLAND/LONG ISLAND SOUND REGION
A. Gowen Sep. 1981 150 p Sponsored in part by Water Resources Council
(PB82-111626) Avail: NTIS HC A07/MF A01 CSCL 13B

This technical assistance report is one product of the New England River Basins Commission's Long Range Dredging Study funded by the Water Resources Council, and was directed primarily to state and local officials involved in dredging management. Part 1 summarizes past dredging and future dredging projections for the New England/Long Island Sound Region. In the past decade, approximately 33 million cu yd of sediment have been dredged from New England/Long Island Sound (NE/LIS) waters. In the next decade, 1.7 million yards per year can be expected annually from Non-Corps of Engineers (CE) projects in the region. Maintenance dredging of 9.5 million cu yd is projected for the next decade. GRA

N82-17413# New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
GROOVE DEPTH REQUIREMENTS FOR TINE-TEXTURED RIGID PAVEMENT 5: DURABILITY OF TINE TEXTURING ON PCC PAVEMENTS Interim Report
John E. Grady and William P. Chamberlin Jun. 1981 41 p refs Sponsored by Federal Highway Administration
(PB82-104951; RR-86; FHWA/NY/RR-81/86) Avail: NTIS HC A03/MF A01 CSCL 13B

The required depth for grooves on new tine textured concrete

pavements in order to assure an adequate skid resistance over their entire design life is discussed. Measurements of texture depth and skid resistance, with both ribbed and smooth tires were made on 0 to 5 year-old New York pavements. Initial groove depth needs of 3/16 in. minimum were calculated from two values estimated from the study data: the minimum depth (0.050 in.) to assure adequate skid resistance with a minimally legal treaded tire, and the mean groove wear rate (0.013 in./million vehicle passes). Groove depth measurements on new concrete pavements and bridge decks indicated 21 an 14 percent compliance, respectively, with the proposed new standard of 3/16 in. minimum, and 60 and 44 percent compliance with the current standard of 2/16 in. minimum. GRA

N82-17414# Austin Research Engineers, Inc., Tex.
MATERIAL PROPERTIES TO MINIMIZE DISTRESS IN ZERO-MAINTENANCE PAVEMENTS. VOLUME 1: MODELS Final Report
J. Brent Bauhut, Freddy L. Roberts, and Thomas W. Kennedy Mar. 1981 170 p refs 2 Vol.
(Contract DOT-FH-11-9349)
(PB82-112905; FHWA/RD-80/155) Avail: NTIS HC A08/MF A01 CSCL 13B

This first volume provides results of a detailed study to: (1) identify distresses that cause significant loss of serviceability and/or maintenance in pavements; (2) identify material properties that significantly influence the occurrence of distress; (3) select the best theoretical or empirical models for predicting distress using material properties and other engineering parameters; and (4) develop a detailed research plan for utilizing the models selected to study the effects of the significant distresses and to optimize material properties for zero-maintenance pavements. The research resulting in the accomplishment of the goals described above also produced other separate and specific results that are reported and should prove useful in future research. GRA

N82-17415# Austin Research Engineers, Inc., Tex.
MATERIAL PROPERTIES TO MINIMIZE DISTRESS IN ZERO-MAINTENANCE PAVEMENTS. VOLUME 2: PARAMETER STUDY Final Report
Freddy L. Roberts, Thomas W. Kennedy, and Gary E. Elkins Mar. 1981 183 p refs 2 Vol.
(Contract DOT-FH-11-9349)
(PB82-112913; FHWA/RD-80/156) Avail: NTIS HC A09/MF A01 CSCL 13B

This second volume provides a summary of a detailed study to: (1) identify distresses that cause significant loss of serviceability and/or maintenance in pavements; (2) identify material properties that significantly influence the occurrence of distress; (3) select the best theoretical or empirical models for predicting distress using material properties and other engineering parameters; and (4) utilize the selected models to study the effects of the significant distresses and to optimize material properties for zero maintenance pavements. The emphasis of this second volume was a discussion of the results of a parameter study with selected models using a range of material properties available in conventional and nonconventional pavement materials. The effects of varying these material properties on various distresses were evaluated and the tradeoffs required were discussed. GRA

N82-17416# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
NEW TECHNOLOGY CHALLENGES METROLOGY
Judson C. French Jul. 1981 93 p Presented at the InterAm. Metrology Conf., Buenos Aires, 4-7 Sep. 1979 Sponsored in part by Organization of American States, Washington, D.C.
(PB82-105974; NBS-SP-611; LC-81-600063) Avail: NTIS HC A05/MF A01 CSCL 14B

Assurance of measurement quality to meet requirements for regulatory agencies, marketplace equity, and productivity and quality control in manufacturing and research is challenged by unprecedented demands for sensitivity, speed, precision, and accuracy over wide ranges of properties and signal characteristics. New approaches are needed. Examples of NBS response, principally in electrical and electronic engineering are described. GRA

N82-17417# Cambridge Univ. (England). Earthquake Engineering Research Center.
THE SEISMIC RESISTANT DESIGN OF R/C COUPLED STRUCTURAL WALLS
A. E. Aktan and V. V. Bertero Jun. 1981 240 p refs
(Grant NSF PFR-79-0894)
(PB82-113358; UCB/EERC-81/07; NSF/CEE-81040) Avail: NTIS HC A11/MF A01 CSCL 13M

Integrated analytical and experimental research on the seismic response of R/C structural wall-frame structures was conducted at U.C. Berkeley for the past decade. Recently considerable efforts were devoted to the study of the seismic behavior of coupled structural walls and their behavior in wall-frame structural systems. A survey of existing analytical and experimental work regarding the seismic response of R/C wall and coupled wall-frame systems, as well as relevant documented post-earthquake studies on these systems, are presented. An assessment of the states of the art and practice regarding the design of building structures incorporating these systems is included. Studies and design and fabrication of the required testing facility necessary for conducting the experimental investigation of seismic behavior of a 1/3-scale model of a 4 1/2-story coupled wall subassemblage belonging to a 15-story prototype structure, are described. Analytical studies of the seismic responses of the prototype buildings are summarized briefly. GRA

N82-17418# Cambridge Univ. (England). Dept. of Engineering.
LIMIT STATE DESIGN IN GEOTECHNICAL ENGINEERING
M. D. Bolton 1981 35 p refs
(PB82-113440; CUED/D-SOILS/TR-103-1981;
ISSN-0309-7439) Avail: NTIS HC A03/MF A01 CSCL 13M

The development of design procedures are summarized. Uncertainty factors in design and problems in interpreting geotechnical data are discussed. Construction concerns were studied and they include: permeability, compressibility, angle of shearing, water pressures, and the selection of limit state models. T.M.

N82-17419# Bureau of Mines, Albany, Oreg. Metallurgy Research Center.
AN INVESTMENT MOLD FOR TITANIUM CASTING
Eugene D. Calvert Jul. 1981 41 p refs
(PB82-104662; BM-RI-8541) Avail: NTIS HC A03/MF A01 CSCL 13I

The Bureau of Mines, in its effort to promote greater utilization of domestically abundant materials, conducted research on an alternate mold material that has commercial potential for titanium investment casting. Using variations of the conventional lost wax molding process, investment shell molds were formed entirely of fused, calcia-stabilized ZrO_2-forming binder. Optimization of binder/slurry properties, stucco grain size and distribution, and curing practices resulted in a structurally sound investment shell that was distortion free and thermally stable. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-17420*# Future Systems, Inc., Gaithersburg, Md.
CROSS-IMPACT STUDY OF FOREIGN SATELLITE COMMUNICATIONS ON NASA'S 30/20 GHz PROGRAM
Aug. 1980 244 p refs
(Contract NAS3-21500)
(NASA-CR-165154; FSI-251) Avail: NTIS HC A11/MF A01 CSCL 17B

A comprehensive traffic demand forecast and a scenario for the transition process from current satellite systems to more advanced systems of the 1990's are presented. Systems configurations with and without the use of 30/20 GHz are described and these two alternatives are compared. It is concluded that: (1) the use of 30/20 GHz will result in increased

satellite capacity, which will be needed to satisfy demand; (2) the use of 30/20 GHz will decrease the transmission cost, especially for broadband communications; (3) in some areas, particularly Europe and Japan but also the U.S., 30/20 GHz is the only available frequency band for customer premise Earth stations because of the dense terrestrial microwave networks; and (4) the development of 30/20 GHz technology will improve U.S. markets for equipment and satellites in many world regions. A.R.H.

N82-17421# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

MULTIPLE-ACCESS CHANNELS WITH DIFFERENT GENERALIZED FEEDBACK SIGNALS

Aydano Barreto Carleial Sep. 1981 39 p refs Presented at the IEEE Intern. Symp. on Inform. Theory, Grignano, Italy, 25-29 Jun. 1979

(INPE-2221-PRE/017) Avail: NTIS HC A03/MF A01

A communication channel with two senders and one receiver, in which each sender observes a private feedback signal is considered. The two feedback signals are not necessarily equivalent to, or derived from the signal observed by the receivers. An achievable rate region is demonstrated for this multiple-access channel by means of a superposition coding scheme. It is shown that a rate region, previously obtained for the multiple-access channel with 'perfect' feedback to both senders, remains achievable when the feedback connection to one of the senders is eliminated. Author

N82-17422# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

AN OVERVIEW ON INCOHERENT SCATTER OBSERVATIONS OF MID-LATITUDE SPORADIC E AND FURTHER COMMENTS FOR IMPROVED DATA ANALYSIS

Carlos Jose Zamlutti Oct. 1981 23 p refs Submitted for publication

(INPE-2247-PRE/031) Avail: NTIS HC A02/MF A01

Incoherent scatter observations of sporadic E were reported from measurements at Arecibo (18.3 N) in the last decade. Some important results achieved are examined as a source for improving sporadic E study referred to the stage at the beginning of the decade. Critical aspects of design and analysis are also considered for improving further experiments. Author

N82-17423# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.

CAVITY LIFETIME PHASE-SHIFT METHOD FOR SENSITIVE REFLECTANCE MEASUREMENTS AT MID-INFRARED WAVELENGTHS

M. A. Kwok, J. M. Herbelin, and R. H. Ueunten 14 Dec. 1981 27 p refs

(ATR-82(8448)-1) Avail: NTIS HC A03/MF A01

The cavity phase shift method measures high reflectances on spherical surfaces with good spatial resolution. Successful demonstration at 2.9 micron wavelength is described. S.L.

N82-17424*# Axiomatix, Los Angeles, Calif.

PRELIMINARY CENTAUR SYSTEMS ANALYSIS Final Report

Robert G. Maronde, Jack K. Holmes, and Richard S. Iwasaki 10 Dec. 1981 150 p refs

(Contract NAS9-16067)

(NASA-CR-167499; R8112-2) Avail: NTIS HC A07/MF A01 CSCL 17B

The Centaur is stored in the Orbiter payload bay on the Centaur Integrated Support System (CISS). The CISS not only cradles the Centaur prior to deployment but also provides any signal conditioning required to make the Centaur/Orbiter hardwire interfaces compatible. In addition, the CISS provides other Centaur functions such as controlling all the avionics safety features and providing all the helium supplies for tank pressurizations. Problems associated with a Centaur design concept using a transponder and two switchable antennas are defined. Solutions to these problems are presented. S.L.

N82-17425# Sheffield Univ. (England). Antennas, Propagation and Digital Image-Processing Group.

[ACTIVITIES REPORT OF THE ANTENNAS, PROPAGATION AND DIGITAL IMAGE-PROCESSING GROUP: RESEARCH IN PROGRESS] Annual Report

1981 57 p refs

Avail: NTIS HC A04/MF A01

Progress is reported in the following: (1) digital processing techniques for the in-line hologram, with an application to ultrasonic imaging; (2) antenna near-field/far-field transformation based on plane wave synthesis from a cylindrical surface; (3) microwave array systems for hyperthermia in the treatment of tumors; (4) ultrasonic quad array imaging system; (5) application of superresolution techniques to time domain reflectometry systems; (6) nondestructive measurement of complex permittivity of dielectric materials at Q-band frequencies; (7) synthetic aperture sonar; (8) refractivity profile inversion using satellite tracking data; and (9) improving the performance of microwave anechoic chambers by space diversity data acquisition and processing; (10) tomography from multiview ultrasonic and microwave diffraction data; (11) synthetic aperture ultrasonic imaging system with digital image reconstruction; (12) microwave diagnostics of the Chilbolton 25 m antenna using the OTS satellite; (13) supersupression of side lobes in linear arrays; (14) nondestructive measurements of complex permittivity of dielectric materials at X-band frequencies; and (15) the development of a subsurface microwave system. Author

N82-17426# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.

A VERY HIGH THROUGHPUT NETWORK: THE ESCALIBUR PROJECT

Jean-Alain Hernandez, Eric Horlatt, Rene Joly, and Guy Pujolle Sep. 1981 7 p refs

(ENST-D-81004) Avail: NTIS HC A02/MF A01

The analysis and construction of a communication network with a very high bandwidth (approximately 1 Giga-bit per second using fiber optics) are discussed. Two applications being considered for this multipurpose network are a high quality multiservice telephone, and a documentary system which creates digital archives. The topology adopted is a ring. The communication medium and the frame structure are described, as well as access to the channel. A functional diagram of the communicator is included. A.R.H.

N82-17427# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).

POSITIONING OF MULTI STOPBAND NOTCHES IN STAGGERED-PRF MTI FILTERS

G. A. Breems 3 Sep. 1979 35 p refs Original contains color illustrations

(LEOK-TR-1979-11; TDCK-73395) Avail: NTIS HC A03/MF A01

Positioning of multi stopband notches in staggered pulse repetition frequency moving target indicator (MTI) filters is presented as a means to control the total stopbandwidth. The MTI filter weighting factors are derived from the notch positions and the pulse period staggering by means of a well-ordered calculation method. The feasibility of this MTI technique is demonstrated by comparison of computer calculations and practical results. Author

N82-17428# Messina Univ. (Italy). Ist. di Struttura Della Materia.

SYMMETRY AND MULTIPLE ELECTROMAGNETIC SCATTERING BY A CLUSTER OF SPHERES Technical Report, Jun. 1979 - Mar. 1981

F. Borghese, P. Denti, G. Toscano, and O. I. Sindoni Aberdeen, Md. Army Armament Research and Development Command Nov. 1981 25 p refs

(Grant DA-ERO-78-G-106)

(AD-A108118; ARCSL-TR-81048) Avail: NTIS HC A02/MF A01 CSCL 20/3

A method to calculate the electromagnetic scattering properties of a cluster of spheres of arbitrary radii and (complex) refractive indexes is proposed. The approach takes proper account of multiple scattering effects and makes full use of the symmetry properties of the cluster. No approximation is required except for the truncation of the multipolar expansion describing the scattered field. Author (GRA)

N82-17429# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA DIRECTION-FINDING CHARACTERISTIC
V. G. Peshekhonov 21 Sep. 1981 22 p refs Transl. into ENGLISH from Antenny (USSR), no. 14, 1972 p 52-60
(AD-A108110; FTD-ID(RS)T-0961-81) Avail: NTIS HC A02/MF A01 CSCL 17/3

The side lobes of the direction finding characteristic of a scanning antenna were studied. The connection between the statistical parameters of the directivity pattern and the direction finding characteristic during a monochromatic and uncorrelated wide band signal was determined. An integral parameter, the coefficient of scattering of the direction finding characteristic, was introduced, and its values were estimated. GRA

N82-17430# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DEFENSE OF RADIO-ELECTRONIC EQUIPMENT
V. Grankin 25 Sep. 1981 20 p Transl. into ENGLISH from Voyennyy Vestn. (USSR), no. 5, 1971 p 88-92
(AD-A108114; FTD-ID(RS)T-1057-81) Avail: NTIS HC A02/MF A01 CSCL 17/4

The problems of defense and protection of radio-electronic facilities used in troop command and control systems and weaponry are addressed. Countermeasures, methods of suppression, such as jammings/interferences are discussed. The possibility of damage to sites housing the equipment from artillery, rockets/missiles, and homing devices is also discussed. M.D.K.

N82-17431# Rochester Univ., N. Y. Dept. of Electrical Engineering.
IMPULSE RESPONSE DETERMINATION IN THE TIME DOMAIN
Tapan K. Sarkar, Donald D. Weiner (Syracuse Univ.), Vijay K. Jain (Univ. of South Florida), and Soheil A. Dianat Nov. 1981 23 p refs
(Contract N00014-79-C-0598; RR0210101)
(AD-A107828; TR-81-10) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper two methods are presented for determining the impulse response of an object in the time domain when both the input and output time domain waveforms are specified. Pole extraction features can then be applied to the nonimpulsive portion of the impulse response to determine the SEM parameters of the object. The first method involves synthetic division and is comparatively straightforward. The second technique is a least squares method which is computationally more stable. The effect of measurement errors in the input and output waveforms is evaluated for each method. An investigation is made as to what form of the input minimizes the noise variances in the computation. Finally a generalized least squares technique is presented which yields a minimum variance unbiased estimate for the impulse response when the noise covariance matrix is known. Author (GRA)

N82-17432# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.
ENHANCEMENT OF POLES IN SPECTRAL ANALYSIS
Fung I. Tseng and Tapan K. Sakar Nov. 1981 33 p refs
(Contract N00014-79-C-0598; NR Proj. 371-014)
(AD-A107739; TR-81-5) Avail: NTIS HC A03/MF A01 CSCL 17/9

This paper presents a new technique for detecting a small pole in the presence of a nearby strong pole. By simultaneously applying the chirp z-transform (CZT) and a recently developed window, the new technique is shown to be able to detect and resolve a small pole. The CZT is efficient since it employs the Fast Fourier Transform (FFT) to evaluate a convolution. But unlike the FFT which is limited to the evaluation of the spectrum on the jw axis, the CZT can evaluate the z-transform on the whole complex plane. And with the use of the new window, which is designed to have a near-sidelobe level of any specified value, the CZT is shown to be able to resolve two closely spaced poles with a large difference in amplitudes. Unlike the Prony's Method, the new technique does not require predetermining the system order. No matrix inversion or solution of polynomial roots is required. Further, the new technique is a linear operation, thus even under noisy environments it yields accurate, stable results for extraction of poles from transient response data. Author (GRA)

N82-17433# Mission Research Corp., La Jolla, Calif.
ANALYTICAL REPRESENTATION OF ATLAS I (TRESTLE) Final Report
F. C. Yang and K. S. H. Lee Kirtland AFB, N. Mex. AFWL Jun. 1981 34 p refs
(Contract F29601-78-C-0082; AF Proj. 3763)
(AD-A107674; AFWL-TR-81-27) Avail: NTIS HC A03/MF A01 CSCL 20/14

Simple engineering analytical formulas are obtained for the ATLAS I fields. These formulas are derived by fitting the first TE surface wave of the ATLAS I wood platform to the field mapping data. An ad hoc term of the form te(-alpha t) is added to the analytical formulas to account for the notch in the ATLAS I field. Author (GRA)

N82-17434# Defense Communications Engineering Center, Reston, Va. Systems Engineering Div.
A MEASURE OF EFFECTIVENESS: ANALYSIS AND APPLICATION
Robert Podell Jun. 1981 39 p refs
(AD-A107886; DCEC-TN-12-81) Avail: NTIS HC A03/MF A01 CSCL 17/2

A measure of effectiveness (M.O.E.) for communications is formulated, in general, and applied to a digital path assuming: no queueing; independent Poisson (long and/or short) failures and exponentially distributed repairs. The M.O.E., the probability of reliable information completion within a tolerable delay given an environment, is evaluated for cases without and with dynamic restoral of failures via repeat transmission. Response time vs. packet length is also modelled. Without dynamic restoral, shown are: reliability is a limiting factor; relative robustness of higher bit rates for voice. With dynamic restoral, the M.O.E. approaches 1 as delay approaches infinity. Author (GRA)

N82-17435# Naval Ocean Systems Center, San Diego, Calif. EM Propagation Div.
WKB MODE SUMMING PROGRAM FOR DIPOLE ANTENNAS OF ARBITRARY ORIENTATION AND ELEVATION FOR VLF/LF PROPAGATION. CALCULATION OF VLF/LF FIELD STRENGTHS IN THE EARTH-IONOSPHERE WAVEGUIDE Interim Report, Oct. 1980 - May 1981
J. A. Ferguson and D. G. Morfitt 1 Oct. 1981 65 p refs
(Grant DNA-MIPR-81-504)
(AD-A107683; NOSC/TR-697) Avail: NTIS HC A04/MF A01 CSCL 20/14

A computer program was developed for calculating VLF/LF field strengths in the earth-ionosphere waveguide whose characteristics may vary along the direction of propagation. The computer program described in this report is a modified version of that described in NELC Interim Report 713, WKB Mode Summing Program for VLF/LF Antennas of Arbitrary Length, Shape, and Elevation. Changes consist of an increase in the number of waveguide slabs from 25 to essentially an unlimited number, more convenient formatting of the input data, especially in the reduction from three to two cards per waveguide mode, an increase in the number of allowable modes from 15 to 30, and the addition of two new output options. This program is referred to as WKBFLDS or FLD4. Use of this program is recommended in instances where the characteristics of the Earth or ionosphere vary slowly along the propagation path. GRA

N82-17436# Naval Research Lab., Washington, D. C.
HF PROPAGATION ASSESSMENT STUDIES OVER PATHS IN THE ATLANTIC Interim Report
D. R. Uffelman 26 Oct. 1981 22 p refs
(AF Proj. X0746CC)
(AD-A107599; NRL-MR-4599) Avail: NTIS HC A02/MF A01 CSCL 20/14

In September, 1980, NRL utilized Barry AN/TRQ-35 oblique sounding equipment which was deployed on board a ship operating in the Atlantic Ocean in order to test a concept to provide a real-time model update with the oblique sounder as a data source. The purpose of this work was to show that very accurate HF channel assessment was possible over paths in the local vicinity of the sounded path. Presented are initial results of an exercise

encompassing two short paths (less than 900 km) in the North Atlantic. These initial results indicate that by utilizing the oblique sounder to update the MINIMUF 3.5 model developed by NOSC, a significant increase in the accuracy of short term forecasting of the Maximum Usable Frequency (MUF) can be obtained. Over a 24-hr period, RMS errors from a model driven by the 5-day running average of 10.7 cm flux were approximately 4 MHz. Utilizing the oblique sounder as an update tool, this RMS error dropped to below 1 MHz. Further results are required, however, to validate the technique over longer periods of time, different geographies, and larger operational areas. Author (GRA)

N82-17437# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Uebertragungstechnik.
AMPLITUDE DENSITY DISTRIBUTION OF A SUM OF SPEECH SIGNALS [AMPLITUDENDICHTEVERTEILUNG EINER SUMME VON VON SPRACHSIGNALEN]
Karl-Heinz Georgi Feb. 1981 17 p refs In GERMAN
(IND-FB-106) Avail: NTIS HC A02/MF A01

Signal transmission by narrow bandwidth with existing criteria of control effectiveness was investigated. Transformation to precode the coefficients is discussed. Speech is not describable as a determining time function and is interpreted as a stochastic process. The coding of the original signal by its coding value while considering its statistical characteristics is described.E.A.K.

N82-17438# National Bureau of Standards, Washington, D.C. Electromagnetic Technology Div.
SHIELDED BALANCED AND COAXIAL TRANSMISSION LINES. PARAMETRIC MEASUREMENTS AND INSTRUMENTATION RELEVANT TO SIGNAL WAVEFORM TRANSMISSION IN DIGITAL SERVICE Final Report
W. L. Gans and N. S. Nahman Jun. 1981 260 p refs Sponsored in part by Army Communications-Electronics Engineering Installation Agency, Ft. Huachuca, Ariz.
(PB82-105297; NBS-TN-1042) Avail: NTIS HC A12/MF A01 CSCL 17B

The impulse and step responses of a shielded cable using time domain terminal measurements and a physically based mathematical model for the transmission line properties of the cable are determined. A computer controlled time domain measurement system was implemented using the automatic pulse measurement system. Data are also developed for the frequency domain complex propagation function (attenuation and its related minimum phase shift). The method is applied to 12 shielded paired conductor (balanced) cables and 5 coaxial cables. Time domain responses are presented for three nominal cable lengths, 60 m (200 ft), 150 m (500 ft), and 300 m (1000 ft). GRA

N82-17240# Joint Publications Research Service, Arlington, Va.
INSTITUTE DIRECTOR DISCUSSES KRT-10 AND OTHER SPACE ANTENNAS
I. Zagura *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 38-41 Transl. into ENGLISH from Stroitelnaya Gazeta (Moscow), 12 Apr. 1981 p 3 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

N82-17096# Research Triangle Inst., Research Triangle Park, N. C.
SIGNAL PROCESSING WITH SYSTOLIC ARRAYS
R. W. Priester, K. Bromley, H. J. Whitehouse, and J. B. Clary *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs (For primary document see N82-17086 08-01)
(Contract N66001-80-C-0118)
Avail: NTIS HC A18/MF A01

N82-17110# Centre National de la Recherche Scientifique, Toulouse (France). Lab. d'Automatique et d'Analyse des Systemes.
RETRANSMISSION STRATEGIES FOR ERROR CONTROL IN PACKET TRANSMISSION PROTOCOLS [LES STRATEGIES DE RETRANSMISSION POUR LE CONTROLE D'ERREUR DANS LES PROTOCOLES DE TRANSFERT DE DONNEES]
Guy Juanole *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17113# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
DISPERSED SENSOR PROCESSING MESH PROJECT
Vincent A. Megna *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-17439*# Hughes Research Labs., Malibu, Calif.
A 10KW SERIES RESONANT CONVERTER DESIGN, TRANSISTOR CHARACTERIZATION, AND BASE-DRIVE OPTIMIZATION Final Report, 6 May 1980 - 15 Sep. 1981
R. Robson and D. Hancock Nov. 1981 152 p
(Contract NAS3-22471)
(NASA-CR-165546) Avail: NTIS HC A08/MF A01 CSCL 09A

Transistors are characterized for use as switches in resonant circuit applications. A base drive circuit to provide the optimal base drive to these transistors under resonant circuit conditions is developed and then used in the design, fabrication and testing of a breadboard, spaceborne type 10 kW series resonant converter. S.L.

N82-17440*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATE-VARIABLE ANALYSIS OF NON-LINEAR CIRCUITS WITH A DESK COMPUTER
Edwin Cohen Jul. 1981 37 p refs Submitted for publication
(NASA-TM-83876) Avail: NTIS HC A03/MF A01 CSCL 09C

State variable analysis was used to analyze the transient performance of non-linear circuits on a desk top computer. The non-linearities considered were not restricted to any circuit element. All that is required for analysis is the relationship defining each non-linearity be known in terms of points on a curve.
Author

N82-17441# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
PHASE DEMODULATOR WITH HIGH TEMPORAL AND ANGULAR RESOLUTION FOR THE MEASUREMENT OF FARADAY ROTATION BY MEANS OF A CARRIER FREQUENCY [PHASENDEMODULATOR MIT HOHER ZEIT- UND WINKELAUFLOESUNG ZUR MESSUNG DER FARADAY-DREHUNG MIT EINEM TRAEGERFREQUENZ-POLARIMETER]
Thomas Vogel Jan. 1981 88 p refs In GERMAN
(IPF-81-4) Avail: NTIS HC A05/MF A01

The relative merits of ringmixers and phase locked loops as phase demodulators in a carrier frequency polarimeter designed to measure the poloidal field intensity in a Tokamak discharge through the induced Faraday rotation are reviewed. Test results on two commercially available demodulators indicate that phase locked loops have a larger linear range and yield much smaller phase errors in the presence of amplitude modulation. A carrier frequency polarimeter, using the selected demodulators, a CO2 laser and an acoustooptical modulator, was built and tested on a solid state InSb semiconductor plasma. A phase resolution of 0.001 radian at a carrier frequency of 40 MHz was achieved. Further improvements are expected in plasma experiments using lower carrier frequencies and increased integration times. Applications to interferometry are also discussed. Author (ESA)

N82-17442# Honeywell Power Sources Center, Horsham, Pa.
HIGH EFFICIENCY LITHIUM-THIONYL CHLORIDE CELL Quarterly Report, 9 Apr. - 8 Jul. 1981
N. Doddapaneni Fort Monmouth, N.J. Army Electronics Research and Development Command Oct. 1981 48 p refs
(Contract DAAK20-81-C-0381; DA Proj. 1L1-62705-AH-94)
(AD-A107949; DELET-TR-81-0381-1; QR-1) Avail: NTIS HC A03/MF A01 CSCL 09/1

The main objectives are to evaluate the polarization characteristics of Teflon bonded carbon electrodes in the Li/SOCl2 system and to improve cathode performance at high discharge rates and low operating temperatures (-40 F to 32 F). During the report period, we have studied the half-cell polarization and discharge performance characteristics of Li/SOCl2 cells with and without improved cathodes. In addition, the effect of catalysts on cyclic volt-ammograms and electrolyte viscosity and conductivity relationships with operating temperature have been examined. Electrolyte properties in Li/SOCl2 systems are found to contribute significantly towards the cathode overpotential. Cathodes doped with catalysts greatly minimized the activation polarization throughout the operating temperatures. Author (GRA)

N82-17443# Defence Research Establishment, Ottawa. (Ontario). Energy Systems Section.
AN OXYGEN ELECTRODE BASED ON NICKEL/COBALT SPINEL
William A. Armstrong Jul. 1981 23 p refs
(AD-A107602; DREO-R-845) Avail: NTIS HC A02/MF A01 CSCL 09/1

It has been demonstrated that nickel/cobalt spinel, $NiCo_2O_4$, can be prepared simply and inexpensively by the thermal decomposition of cobalt nitrate on sintered nickel plaque. Electrodes suitable for use in metal/air batteries and fuel cells have been developed which will reduce oxygen from the air at room temperature and a current density of 50mA/sq cm for more than a year. A modification of this electrode will perform satisfactorily for more than 200 cycles of oxygen reduction/oxygen evolution at 50mA/sq cm. Author (GRA)

N82-17444# Naval Coastal Systems Center, Panama City, Fla.
IMPEDANCE MATCHING FOR LONG CABLES CARRYING ULTRASONIC SIGNALS
John Mittleman Oct. 1981 37 p
(AD-A107935; AD-E200015; NCSC-TM-325-81) Avail: NTIS HC A03/MF A01 CSCL 09/1

Long coaxial cables, when used for ultrasonic inspection, have been known to produce extraneous signals and attenuate valid signals. In this report, the theory of transmission lines is applied to such cables and is shown to predict the unwanted phenomena. The theory is then applied to the design of matching networks composed of one resistive and one inductive component. A series R-L network placed in parallel with the transducer is shown to produce a satisfactory impedance match, and its performance is demonstrated through experiments on a 1000-foot length of coaxial cable terminated by the network and an ultrasonic transducer. GRA

N82-17445# Bendix Corp., Kansas City, Mo.
HIGH FREQUENCY SEMICONDUCTOR TESTING Final Report
L. A. Robinson Sep. 1981 16 p
(Contract DE-AC04-76DP-00613)
(DE82-000926; BDX-613-2685) Avail: NTIS HC A02/MF A01

High-frequency hybrids were tested on fixtures that used stripline techniques for matching and interconnection. A number of problems with proper grounding were encountered, along with hybrid breakage that occurred when increased force was used to improve ground reliability. The approach used in this effort generally overcame these problems. An adapter scheme was developed that permitted testing a wide variety of hybrid physical configurations on a single tester. DOE

N82-17446# Bendix Corp., Kansas City, Mo.
SOLDERABILITY IMPROVEMENTS FOR DRAG SOLDERED PWBs Final Report
M. A. Trent Sep. 1981 12 p refs
(Contract DE-AC04-76DP-00613)
(DE82-000961; BDX-613-2640) Avail: NTIS HC A02/MF A01

The causes of solderability problems on drag soldered printed wiring boards (PWBs) were investigated. Excessive removal of tin-lead from the PWB surface was found to be the major cause. A solder leveling method was incorporated to control the consistency of the tin-lead removal process. DOE

N82-17447# Bendix Corp., Kansas City, Mo.
THICK-FILM ANALYSIS: LITERATURE SEARCH AND BIBLIOGRAPHY
R. W. Gehman Sep. 1981 27 p
(Contract DE-AC04-76DP-00613)
(DE82-000960; BDX-613-2689) Avail: NTIS HC A03/MF A01

A literature search was conducted to support development of in-house diagnostic testing of thick film materials for hybrid microcircuits. A background literature review covered thick film formulation, processing, structure, and performance. Important material properties and tests were identified and several test procedures were obtained. Several tests were selected for thick film diagnosis at Bendix Kansas City. DOE

N82-17448# Westinghouse Research and Development Center, Pittsburgh, Pa.
MATERIALS RESEARCH FOR HYDROGEN-COOLED SUPERCONDUCTING POWER TRANSMISSION LINES Quarterly Report, 1 Apr. - 30 Jun. 1981
A. M. Sletten, A. I. Braginski, M. Rosado, J. R. Gavaler, J. Greggi, J. Schreurs, R. H. Hammond, J. R. Kwo, M. Perez, J. Talvacchio et al 1981 42 p refs Prepared in cooperation with Stanford Univ., Calif.
(Contract DE-AC02-89ET-29354)
(DE82-002171; DOE/ET-29354/T1; QR-7) Avail: NTIS HC A03/MF A01

Dielectric breakdown and loss measurements in liquid hydrogen and liquid hydrogen impregnated synthetic dielectrics are investigated at temperatures between 14 and 200K and at hydrostatic pressures up to five atmospheres. The effects of dissolved impurities/additives in the liquid are determined, and the self field and low field superconducting properties of high critical temperature materials at temperatures between approximately 14 and 200K are characterized. The construction of the dielectric test apparatus continued and the system of small electrodes was completed. Difficulties were encountered in the construction of the LH2 vessels and the junction box, which have retarded their completion. DOE

N82-17449# National Bureau of Standards, Washington, D.C. National Measurement Lab.
SIXTH INTERNATIONAL CONFERENCE ON NOISE IN PHYSICAL SYSTEMS Final Report
P. H. E. Meijer, R. D. Mountain, and R. J. Soulen, Jr. Sep. 1981 429 p refs Conf. held at Gaithersburg, Md., 6-10 Apr. 1981 Sponsored in part by NBS and The Catholic Univ. of America, and NSF
(PB82-105305; NBS-SP-614; LC-81-600084) Avail: NTIS HC A19/MF A01 CSCL 09C

The full text of papers submitted to the Sixth International Conference on Noise in Physical Systems is reported. There are six categories of papers: theory; devices; 1/f noise; applications and measurement techniques; quantum noise; hot carrier noise. GRA

N82-17450# Westinghouse Electric Corp., East Pittsburgh, Pa.
EVALUATION OF CONTROL AND PROTECTION CIRCUITS Open File Report, 13 Nov. 1979 - 31 Mar. 1981
E. C. Strycula and D. A. Paice Apr. 1981 50 p refs
(Contract DI-BM-JO-308035)
(PB82-105065; BM-OFR-126-81) Avail: NTIS HC A03/MF A01 CSCL 08I

Solid state equipment offers a number of potential advantages in the coal mining industry. These advantages can only be realized, however, through careful and judicious design of the control and protection circuitry. Problems relating to the interaction of solid state equipment on the electrical system and the special design considerations that apply to solid-state circuitry are examined. Design guidelines are provided for solid-state applica-

tions in the areas of: (1) equipment operated from a dc trolley wire, (2) drive systems for surface mining equipment, (3) ac motor starters, and (4) electromagnetic interference. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-17451 Yale Univ., New Haven, Conn.
BROAD-BAND ROTATIONAL CARS THERMOMETRY IN NITROGEN GAS Ph.D. Thesis
Daniel Vincent Murphy 1981 120 p
Avail: Univ. Microfilms Order No. 8126362

Coherent anti-Stokes Raman scattering (CARS) from the pure rotational Raman lines of N2 is employed to measure the instantaneous rotational temperature of N2 gas at room temperature and below with good spatial resolution. A broad bandwidth dye laser is used to obtain the entire rotational spectrum from a single laser pulse; the CARS signal is then dispersed by a spectrograph and recorded on an optical multichannel analyzer. A best fit temperature is found in several seconds with the aid of a computer for each experimental spectrum by a least squares comparison with calculated spectra. The model used to calculate the theoretical spectra incorporates the temperature and pressure dependence of the pressure-broadened rotational Raman lines, includes the nonresonant background susceptibility, and assumes that the pump laser has a finite linewidth. Temperatures are fit to experimental spectra recorded over the temperature range of 135 to 296 K, and over the pressure range of 0.13 to 15.3 atm. Emphasis is placed on the quantitative evaluation of single pulse rotational CARS as a temperature measurement technique. Dissert. Abstr.

N82-17452# Bettis Atomic Power Lab., West Mifflin, Pa.
COMPARISON OF REZONE ALGORITHMS FOR INCOMPRESSIBLE FLUID FLOW CALCULATIONS
M. M. Sussman Mar. 1981 25 p refs Backup document for AIAA Synoptic scheduled for publication in the AIAA Journal in Jul. 1982
(LOG-J12823) Avail: NTIS HC A02/MF A01

The state of the art in computational fluid dynamics has progressed to the point that the computations are performed using mesh grids which conform with temporally changing features of the flow solution itself. A comparison of two rezone algorithms designed to account for the effects of temporally changing mesh grids are presented in order to determine the one with the lesser adverse effect on the fluid flow solution. Of the two algorithms tested, the one based on interpolation is preferred over the one based on conservation of momentum. S.L.

N82-17453*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF ARC CURRENT ON THE LIFE IN BURNER RIG THERMAL CYCLING OF PLASMA SPRAYED ZrOSUB2-YSUB2OSUB3
R. C. Hendricks and G. McDonald 1982 9 p refs Presented at the 6th Ann. Conf. on Composites, Cocoa Beach, Fla., 17-21 Jan. 1982; sponsored by the American Ceramic Society
(NASA-TM-82795; E-1129) Avail: NTIS HC A02/MF A01 CSCL 20D

An analysis of thermal cycle life data for four sets of eight thermal barrier coated specimens representing arc currents (plasma gun power) of 525, 600, 800, or 950 amps is presented. The ZrO2-8Y2O3/NiCrAlY plasma spray coated Rene 41 rods were thermal cycled to 1040 C in a Mach 0.3-Jet A/air burner flame. The experimental results indicate the existance of a minimum or threshold power level which coating life expectancy is less than 500 cycles. Above the threshold power level, coating life expectancy more than doubles and increases with arc current. T.M.

N82-17454# Stiebel Eltron G.m.b.H. und Co. K.G., Holtzminden (West Germany).
DEVELOPMENT OF AN ABSORPTION HEAT PUMP SYSTEM OPERATING WITH PRIMARY ENERGY TO HEAT APARTMENT BUILDINGS. DUAL COMPONENTS MIXTURE R 22-E 181 Final Report, Jun. 1980
Karl-Heinz Schrader Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 56 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-208; Rept-1; ISSN-0340-7608) Avail: NTIS HC A04/MF A01

Tests have shown that the mixture stays stable even in extreme situations, and reproducable measurements were obtained. Deviations from the theoretical heat ratio to the measured one are only due to under-dimensioned components. The planning, development and construction of the first proto type as well as its operation, computing of data and evaluation are described. T.M.

N82-17455# Technische Univ., Aachen (West Germany). Inst. of Ferrous Metallurgy.
PRELIMINARY INVESTIGATIONS ON THE INJECTION OF A COAL-OIL-SLURRY INTO THE BLAST FURNACE Final Report
Ulrich Rejek and Friedrich Hermann Franke Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 83 p refs Sponsored by the Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-221; ISSN-0340-7608) Avail: NTIS HC A05/MF A01

The flow and pumping behaviour and sedimentation of coal-oil-slurries as a function of concentration, temperature, coal and oil type, grain size, size distribution, pipe geometry etc. were determined. The results are intended to facilitate the planning of an injection plant and to enable an assessment of the economic feasibility of such a plant. The results show that for trouble-free transportation, (without undue increase in viscosity) the maximum coal concentration is 50 percent by weight with lignite coal-oil-slurries and 65 percent by weight with bituminous low volatile coal-oil-slurries at 80 C. A fine grinding of the coals leads to high viscosity in the slurries. The utilization of coarse particles leads to a rapid sedimentation at low velocities. T.M.

N82-17456*# Stanford Univ., Calif. Dept. of Mechanical Engineering.
TURBULENT BOUNDARY LAYER HEAT TRANSFER EXPERIMENTS: CONVEX CURVATURE EFFECTS INCLUDING INTRODUCTION AND RECOVERY Final Report
T. W. Simon, R. J. Moffat, J. P. Johnston, and W. M. Kays Washington NASA Feb. 1982 217 p refs
(Grants NsG-3124; NAG3-3)
(NASA-CR-3510; HMT-32) Avail: NTIS HC A10/MF A01 CSCL 20D

Measurements were made of the heat transfer rate through turbulent and transitional boundary layers on an isothermal, convexly curved wall and downstream flat plate. The effect of convex curvature on the fully turbulent boundary layer was a reduction of the local Stanton numbers 20% to 50% below those predicted for a flat wall under the same circumstances. The recovery of the heat transfer rates on the downstream flat wall was extremely slow. After 60 cm of recovery length, the Stanton number was still typically 15% to 20% below the flat wall predicted value. Various effects important in the modeling of curved flows were studied separately. These are: the effect of initial boundary layer thickness, the effect of freestream velocity, the effect of freestream acceleration, the effect of unheated starting length, and the effect of the maturity of the boundary layer. An existing curvature prediction model was tested against this broad heat transfer data base to determine where it could appropriately be used for heat transfer predictions. S.L.

N82-17457# Helsinki Univ. of Technology, Espoo (Finland). Dept. of Chemistry.
FLUID FLOW AND GAS DISPERSION IN STIRRED TANK REACTORS Ph.D. Thesis
Jouko Laine 1981 40 p refs
Avail: NTIS HC A03/MF A01

Fluid flows, heat transfer, and dispersion of gas in stirred

tank reactors was studied. Dead zone formation of the used pseudoplastic slurries was examined theoretically and experimentally to discover a suitable scale up method for these reactors. The theoretical calculations are based on theories of maximum gas flow in stirred tank reactors, and on Kolmogoroff's theories on length and velocity scales of turbulence. A method was developed for estimation of the reactor response by means of matrices. With this model the response of δ(t)-pulse or step response for both batch and continuous system can be calculated. M.D.K.

N82-17458# Imperial Coll. of Science and Technology, London (England). Centre for Computational Fluid Mechanics, Heat Transfer and Combustion.

A GENERAL PURPOSE COMPUTER PROGRAM FOR MULTIDIMENSIONAL ONE AND TWO PHASE FLOW

D. B. Spalding Jun. 1981 33 p refs Presented at IMACS Meeting, Bethlehem, Penn., 1981

(NTS/81/11) Avail: NTIS HC A03/MF A01

A reliable and economical standard computer program, incorporating the well established balance laws of fluid mechanics, heat transfer and mass transfer, and structured so that particular material properties, geometries and boundary conditions could be easily incorporated is described. Its nature, current capabilities, and development possibilities are included. J.M.S.

N82-17459# Open Univ., Milton (England). Energy Research Group.

EVALUATION OF THE DESIGN, CONSTRUCTION AND OPERATION OF A GAS FUELED ENGINE DRIVEN HEAT PUMP

C. A. Phillips Jan. 1981 76 p refs

(ERG-034) Avail: NTIS HC A05/MF A01

The design, construction, testing, and evaluation of a gas fueled engine driven heat pump are considered. The heat pump, using air as its source of heat is driven by a 360 cc single cylinder marine engine converted to run on natural gas. The unit was built, installed in a laboratory, and underwent intensive performance testing. The heat pump works well and justifies the design assumptions made, having allowed for a poor performance from the particular engine used. At 6 C (ambient) an output of 14 kW with an overall efficiency or C.O.P. (total heat output/gas input) of 1.1 was achieved. Results compare favorably with a seasonal efficiency of a gas boiler of around 0.65 to 0.70. J.M.S.

N82-17460# Commission of the European Communities, Ispra (Italy). Joint Research Centre.

CONVEC: A COMPUTER PROGRAM FOR TRANSIENT INCOMPRESSIBLE FLUID FLOW BASED ON QUADRATIC FINITE ELEMENTS. PART 1: THEORETICAL ASPECTS

H. Laval 1981 54 p refs Submitted for publication 2 Vol.

(EUR-7427/I-EN-Vol-1) Avail: NTIS HC A04/MF A01

The theoretical and numerical aspects of the finite element computer code CONVEC designed for the transient analysis of two-dimensional plane or three-dimensional axisymmetric incompressible flows including the effects of heat transfer are described. The governing equations are the time-dependent incompressible Navier-Stokes equations and the thermal energy equation. The finite element method (FEM) is employed as a basic spatial discretization technique. The elements included in CONVEC are the isoparametric and subparametric quadrilaterals and triangles with quadratic local temperature and velocity fields. The pressure is given by a linear approximation and is discontinuous from one element to the other. A finite difference explicit integration scheme is used to advance the solution in time. J.M.S.

N82-17461# Commission of the European Communities, Ispra (Italy). Joint Research Centre.

CONVEC: A COMPUTER PROGRAM FOR TRANSIENT INCOMPRESSIBLE FLUID FLOW BASED ON QUADRATIC FINITE ELEMENTS. PART 2: USER'S MANUAL

H. Laval 1981 69 p ref Submitted for publication 2 Vol.

(EUR-7427/II-EN-Vol-2) Avail: NTIS HC A04/MF A01

The computer code CONVEC is a general computer program designed for the solution of transient two-dimensional incompressible fluid flow problems. The solution procedure is based on the finite element method. The class of problems treated by the present version of CONVEC are those described by the time-dependent, two-dimensional (plane or axisymmetric) form of the Navier-Stokes equations. The flow field is assumed to be laminar and the fluid Newtonian and incompressible within the Boussinesq approximation. An energy equation is also included in the formulation for problems in which heat transfer effects are important. The specific types of flow problems for which CONVEC is suitable include: isothermal flow problems; free or forced convection problems; and convective-conductive heat transfer problems including solid body heat conduction. The input data necessary to access and execute the code is described. J.M.S.

N82-17462# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

UNIAXIAL MODEL FOR A GAS LOADED VARIABLE CONDUCTANCE HEAT PIPE

J. vanderVooren, A. A. H. Delil, and A. Sanderse 16 Jun. 1980 56 p refs

(Contract NIVR-1833)

(NLR-TR-80048-U) Avail: NTIS HC A04/MF A01

A uniaxial model for a gas loaded variable conductance heat pipe (VCHP) is developed. This model takes into account the diffusion at the vapor gas interface as well as the inertial effects of the moving vapor. Only steady state conditions are considered. The generally accepted Edwards/Marcus model is shown to be a first order approximation of this model. Also a criterion derived to identify the conditions under which the Edwards/Marcus model is feasible. Numerical examples will show that there are substantial discrepancies between the results of the Edwards/Marcus model and the present model for high values of the equivalent radial thermal conductivity of the condenser wall and wick and operating temperatures not too far from the freezing point of the working fluid. Author

N82-17463# National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.

AN IMPROVED FLAT FRONT MODEL FOR A GAS LOADED VARIABLE CONDUCTANCE HEAT PIPE

J. vanderVooren and A. Sanderse 16 Jun. 1980 26 p refs (Contract NIVR-1833)

(NLR-TR-80049-U) Avail: NTIS HC A03/MF A01

A uniaxial flat front theory is presented for a gas loaded variable conductance heat pipe. The theory takes into account the inertial effects of the moving vapor, which can grow large under certain circumstances, but neglects the axial heat conduction of the wall and wick. A limited number of numerical examples indicates excellent agreement with the corresponding diffuse front theory. The differences with a similar flat front theory, which neglects the inertial effects of the moving vapor, can become substantial. In comparison with diffuse front based calculations, the computation times are very short. Author

N82-17464# Pennsylvania State Univ., University Park. Applied Research Lab.

INVERSE AXISYMMETRIC BODY STUDY

J. J. Eisenhuth and G. H. Hoffman 19 Aug. 1981 284 p refs

(Contract N00024-79-C-6043)

(AD-A107662; ARL/PSU/TM-81-177) Avail: NTIS HC A13/MF A01 CSCL 20/4

A potential flow inverse body method was used to generate a family of underwater bodies that would generally possess extensive laminar flow by the use of surface heat addition. Parameters specifying the pressure coefficient distribution were varied in order to find the limits of these parameters beyond which a body could not physically be generated. Length-to-diameter ratios and prismatic coefficients were computed as a function of the parameters. Specific cases representing the limits of parameters are used as examples in the graphical presentation of body contours and pressure coefficient distributions. Curves of temperature and heat flux distributions showing limits for the effective use of heat in suppressing boundary layer transition are also presented for these cases. Author (GRA)

N82-17465# California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.

THE COHERENT STRUCTURE OF TURBULENT MIXING LAYERS. 1: SIMILARITY OF THE PRIMARY VORTEX STRUCTURE. 2: SECONDARY STREAMWISE VORTEX STRUCTURE

Luis P. Bernal Jun. 1981 108 p refs
(Contracts N00014-76-C-76-C-0260; N00014-C-0365; NR Proj. 062-431)
(AD-A108049) Avail: NTIS HC A06/MF A01 CSCL 20/4

The primary spanwise organized vortex structure and the secondary streamwise vortex structure of turbulent mixing layers have been investigated. Flow visualization motion pictures of a constant density mixing layer were used to measure the properties of the large scale vortices. It was found that after an initial transition region mean properties of the large scale vortices reach the expected linear growth with downstream distance required by similarity. In the self-similar region, the vortex core area and visual thickness increase continuously during its life-span. A theoretical model of probability distribution function for the large-scale vortex circulation was developed. This distribution is found to be lognormal and to have a standard deviation, normalized with the mean of 0.28. From this model the mean life-span of the vortices could also be obtained and was found to be 0.67 times the mean life-span position. The streamwise streak pattern observed by Konrad (1976) and Breidenthal (1978) in plan-view pictures of the mixing layer was investigated, using flow visualization and spanwise concentration measurements. It was confirmed that this pattern is the results of a secondary vortex structure dominated by streamwise, counter-rotating vortices. A detailed description of its spatial relation to the primary, spanwise vortex structure is presented. From time average flow pictures, the onset position and initial scale of the secondary structures were determined. GRA

N82-17466# Ballistic Research Labs., Aberdeen Proving Ground, Md.

STREAMWISE VORTICITY DECAY DOWNSTREAM OF A THREE DIMENSIONAL PROTUBERANCE Final Report

C. W. Kitchens, Jr., N. Gerber, R. Sedney, and J. M. Bartos Oct. 1981 48 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A108080; ARBRL-TR-02375) Avail: NTIS HC A03/MF A01 CSCL 20/4

Streamwise vortices generated in bounary layers are known to persist for hundreds of boundary-layer thicknesses. This remarkable property is the main topic of this report. The particular case of the flow field generated by a three-dimensional protuberance immersed in a flat plate boundary layer is studied using numerical modeling. Experimental measurements in a downstream crossflow plane are used to construct initial data for a marching calculation using the boundary-layer and boundary-region approximations; the latter includes crossflow diffusion terms. The former fails to predict the flow field, but results from the latter agree qualitatively in aspects of the flow field determined from the measurements of Tani, et al., and are also in fair quantitative agreement. Author (GRA)

N82-17467# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

METHOD FOR CALCULATING THREE-DIMENSIONAL FLOW IN BLADED TURBOMACHINE BY USING ARBITARY QUASI PERPENDICULAR INTERSECTING PLANES

Xin Xiaokang and Jiang Jinliang 9 Oct. 1981 20 p refs Transl. into ENGLISH from Li-Hseuh(Mechanics) (China), n. 2, 1977 p 106-113
(AD-A106475; FTD-ID(RS)T-0928-81) Avail: NTIS HC A02/MF A01 CSCL 20/4

The mutual influence between two groups of flow surfaces is simultaneously considered, so that no correction need to be made from each other by successive substitution between these two groups of flow surfaces. The theory of a variable curve sample is applied. After appropriate successive substitutions of spatial streamlines, the three dimensional solution of the entire blade channel can be directly calculated, including shapes of arbitrary S sub 1 and S sub 2 flow surfaces, shapes of spatial streamlines, and the distribution of flow parameters, such as velocity and pressure. As the first step in solving the real three dimensional flow field, the approximate hypothesis that the S sub 1 flow surface is a surface of revolution is applied. The solution obtained is basically still the quasi three dimensional solution. The next step is to eliminate the hypothesis that the S sub 1 surface is a surface of revolution in order to obtain the solution of a real three dimensional flow field. Then the curvature of S sub 1 flow surface can be calculated. Author

N82-17468# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

EXPERIMENTAL INVESTIGATIONS OF GAS TRANSPORT SYSTEMS [EXPERIMENTELLE UNTERSUCHUNGEN AN GAS-TRANSPORT-SYSTEMEN]

A. J. Hautojaervi (Helsinki Univ.) and W. J. Hiller Dec. 1980 31 p refs In GERMAN
(MPIS-30/1980; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,65

The supply of single radioactive atoms or molecules (with gas as a carrying agent) to measuring instruments is discussed. Gas transport systems are of simple construction. When half life of the product is shorter, the transport time from reaction chamber to collection film has to be decreased. The carrying particles often get stuck in the tube wall because of its turbulent oscillation motion. The fast gas transport system and the current path for compressible and viscous medium and transport time measurements with electrically charged aerosols is pointed out. It is shown that the expected transport efficiency of radioactive particles and the strong yield changes in the relationships of transport time with half life time is an interesting method for calculating the separation process in two phase flow. E.A.K.

N82-17469# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).

[SCIENTIFIC REPORT OF THE FLUID MECHANICS RESEARCH DEPARTMENT] Annual Report, 1980

1980 105 p refs
Avail: NTIS HC A06/MF A01

Research in theoretical and experimental fluid mechanics, propulsion technology, acoustics, and aerodynamic design is reported. Boundary layer flow, high speed train aerodynamics, cryogenic wind tunnels, compressors, helicopter interior noise, and aircraft design are among the topics described. Test facilities computational methods and experimental procedures are outlined. Author (ESA)

N82-17470# Imperial Coll. of Science and Technology, London (England). Heat Transfer Section.

APPLICATION OF THE ESCIMO THEORY TO THE OXIDATION OF METHANE IN A STIRRED REACTOR M.S. Thesis - London Univ.

M. E. Sherrington Sep. 1979 243 p refs
(HTS/79/14) Avail: NTIS HC A11/MF A01

An investigation into the reaction between methane and air under turbulent conditions in a stirred reactor is proposed. Problems arising in the modeling of turbulent flows involving exothermic chemical reaction are outlined and different approaches to a solution are reviewed. The ESCIMO theory is described. A computer code which applies the ESCIMO theory to the biographic features of the multistep hydrogen-oxygen reaction is outlined and the changes necessary for program adaption to methane-air reaction are discussed. Experimental studies on the chemical kinetics and flame propagation of the methane-air system are reviewed. Results from computer simulations on near stoichiometric methane-air mixtures reflect the existence of laminar flame speed control, stretching control, and chemical kinetics control burning regimes. Grid independence tests and step size control tests carried out on stretching regime indicate a cross stream grid of 40 nodes is acceptable. Author (ESA)

N82-17471# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

DENSITY MEASUREMENTS IN GAS PARTICLE FLOWS

L. Lourenco and M. L. Riethmuller May 1981 30 p refs
(VKI-TM-32) Avail: NTIS HC A03/MF A01

Concentration distribution measurement of the particulate phase in suspension of solid particles, having diameters > 100 microns, is discussed. An analog method which uses the linear proportionality law existing between the attenuation of a narrow light beam when crossing a particle cloud and particle

density is compared with a digital method which counts particles crossing a control surface (a narrow light beam) per unit time. The digital method is best for a low particle density, the analog for high density. Neither method can measure local concentration values. An automatic gain amplifier improves the digital method accuracy. Author (ESA)

N82-17472# Cambridge Univ. (England). Dept. of Engineering.

PROGRAM FINSUP: STEADY AND UNSTEADY SUPERSONIC FLOW IN CASCADES BY A FINITE ELEMENT METHOD

D. S. Whitehead 1981 27 p
(PB82-114612; CUED/A-TURBO/TR-105-1981; ISSN-0309-6521) Avail: NTIS HC A03/MF A01 CSCL 20D

The program runs in three sections. The first section generates the mesh, the second section calculates the steady flow through the cascade, and the third section calculates unsteady pressure distributions, force coefficients and moment coefficients due to translational and torsional motion of the blades. These sections are linked by a control program. Since the program assumes potential flow it cannot deal with wakes coming from upstream and shock waves are smeared. Flow round the leading edges of thick blades is correctly handled, and the program also allows for acoustic waves propagated upstream and downstream. GRA

N82-17473 Colorado State Univ., Fort Collins.

BIFURCATING INSTABILITY OF THE FREE SURFACE OF A FERROFLUID Ph.D. Thesis

Evan Eugene Twombly 1981 73 p
Avail: Univ. Microfilms Order No. 8126459

A slab of ferro-fluid bounded below by a fixed boundary and above a vacuum was considered. If the fluid was subjected to a vertically directed magnetic field of sufficient strength, surface waves appeared. Equations which descibe this phenomena were derived. In the physical space no natural Banach space structure was available due to the free surface. A transformation of coordinates was made, mapping the surface flat. In the new coordinate system the equations define an operator between Banach spaces. The minimum eigenvalue of the linearized operator is the critical magnetic field strength where the planar surface loses stability. Using a generalized inverse of the Frechet derivative of the operator and the Implicit Function Theorem, the existence of a nontrivial branch of solutions was proved. A local stability criterion was also obtained and applied to three periodic structures: rolls, squares and hexagons. Dissert. Abstr.

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-17474 British Broadcasting Corp., Kingswood (England). Research Dept.

A DIGITAL FIELD STRENGTH MEASURING RECEIVER FOR L. F. AND M. F.

A. P. Robinson and J. H. Causebrook Nov. 1981 12 p refs
(BBC-RD-1981/7) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

The measuring receiver gives a direct reading of field strength in decibels relative to 1 micro V/m for both the electric and the magnetic field components in the l.f. and m.f. broadcast bands. Digital techniques are used extensively to give simple and reliable operation. The receiver is suitable for making measurements on the move in a car, and an omni-directional magnetic field detector is provided. T.M.

N82-17475*# Michigan Univ., Ann Arbor. Interferometry Lab.

HOLOGRAPHIC INTERFEROMETRY OF TRANSPARENT MEDIA WITH REFLECTION FROM IMBEDDED TEST OBJECTS

I. Prikryl and C. M. Vest Oct. 1981 26 p refs
(Grant NAG2-118)
(NASA-CR-168395; INTFL-8103) Avail: NTIS HC A03/MF A01 CSCL 14E

In applying holographic interferometry, opaque objects blocking a portion of the optical beam used to form the interferogram give rise to incomplete data for standard computer tomography algorithms. An experimental technique for circumventing the problem of data blocked by opaque objects is presented. The missing data are completed by forming an interferogram using light backscattered from the opaque object, which is assumed to be diffuse. The problem of fringe localization is considered. J.D.H.

N82-17476*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ACOUSTIC GROUND IMPEDANCE METER

Allan J. Zuckerwar Dec. 1981 16 p refs Presented at the 102nd Meeting of the Acoustical Soc. of Am., 3 Dec. 1981
(NASA-TM-83227) Avail: NTIS HC A02/MF A01 CSCL 14B

A compact, portable instrument was developed to measure the acoustic impedance of the ground, or other surfaces, by direct pressure-volume velocity measurement. A Helmholz resonator, constructed of heavy-walled stainless steel but open at the bottom, is positioned over the surface having the unknown impedance. The sound source, a cam-driven piston of known stroke and thus known volume velocity, is located in the neck of the resonator. The cam speed is a variable up to a maximum 3600 rpm. The sound pressure at the test surface is measured by means of a microphone flush-mounted in the wall of the chamber. An optical monitor of the piston displacement permits measurement of the phase angle between the volume velocity and the sound pressure, from which the real and imaginary parts of the impedance can be evaluated. Measurements using a 5-lobed cam can be made up to 300 Hz. Detailed design criteria and results on a soil sample are presented. T.M.

N82-17477# National Aerospace Lab., Tokyo (Japan).

A VELOCITY VECTOR MEASURING SYSTEM WITH 13 ASYMMETRIC WEDGE TYPE YAWMETERS

Teruomi Nakaya, Hideo Hoshio, and Masayoshi Noguchi Jun. 1981 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-674; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

In order to survey the flow field around the empennage of the NAL STOL research aircraft model in the 6m low speed wind tunnel, a velocity vector measuring system with 13 asymmetric wedge type yawmeters was developed. The rotational angle of the 13 probes and the setting angle of this system are automatically controlled following the sequence previously programmed into a minicomputer system. The hardware, control modes, data reduction, and data processing are described. The accuracy of the flow angle measurement turned out to be satisfactory, but measurements of dynamic pressure and static pressure were less accurate. An example of measurements taken of the flow field around the empennage of the STOL research aircraft model is included. A.R.H.

N82-17478*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

DEVELOPMENT OF A SIMPLE, SELF-CONTAINED FLIGHT TEST DATA ACQUISITION SYSTEM Progress Report

Ronald R. L. Renz Feb. 1981 208 p refs
(Grant NsG-4019)
(NASA-CR-168438; KU-FRL-407-6) Avail: NTIS HC A10/MF A01 CSCL 14B

A low cost flight test data acquisition system, applicable to general aviation airplanes, was developed which meets criteria for doing longitudinal and lateral stability analysis. Th package consists of (1) a microprocessor controller and data acquisition module; (2) a transducer module; and (3) a power supply module. The system is easy to install and occupies space in the cabin or baggage compartment of the airplane. All transducers are contained in these modules except the total pressure tube, static pressure air temperature transducer, and control position

transducers. The NASA-developed MMLE program was placed on a microcomputer on which all data reduction is done. The flight testing program undertaken proved both the flight testing hardware and the data reduction method to be applicable to the current field of general aviation airplanes. A.R.H.

N82-17479# Danish Meteorological Inst., Copenhagen.
QD: A QUARTZ DECLINOMETER OF CLASSIC TYPE
E. Kring Lauridsen 1981 29 p refs
(DMI-Geophys-Papers-R-65; ISBN-87-7478-180-8) Avail: NTIS HC A03/MF A01

A declinometer with quartz fibre suspension is described. The magnet is a bar with the mirror fixed on the plane face and the magnet is firmly attached to the stirrup which can be clamped during transport. The theory of the suspended system is described in three dimensions and all details of measurement are given. Author

N82-17480# Pennsylvania Univ., Philadelphia. Electro-Optics and Microwave-Optics Lab.
HIGH RESOLUTION 3-D WAVELENGTH DIVERSITY IMAGING Final Report, 1 Aug. 1980 - 31 Jul. 1981
N. H. Farhat 25 Sep. 1981 62 p refs
(Grant AF-AFOSR-0281-80; AF Proj. 2305)
(AD-A107832; EO/MO-4; AFOSR-81-0731TR) Avail: NTIS HC A04/MF A01 CSCL 20/3

A physical optics, vector formulation of microwave imaging of perfectly conducting objects by wavelength and polarization diversity is presented. The results provide the theoretical basis for optimal data acquisition and three-dimensional tomographic image retrieval procedures. These include: (a) the selection of highly thinned (sparse) receiving array arrangements capable of collecting large amounts of information about remote scattering objects in a cost effective manner and (b) techniques for 3-D tomographic image reconstruction and display in which polarization diversity data is fully accounted for. Data acquisition employing a highly attractive AMTDR (Amplitude Modulated Target Derived Reference) technique is discussed and demonstrated by computer simulation. Equipment configuration for the implementation of the AMTDR technique is also given together with a measurement configuration for the implementation of wavelength diversity imaging in a roof experiment aimed at imaging a passing aircraft. Extension of the theory presented to 3-D tomographic imaging of passive noise emitting objects by spectrally selective far field cross-correlation measurements is also given. Finally several refinements made in our anechoic-chamber measurement system are shown to yield drastic improvement in performance and retrieved image quality. Author (GRA)

N82-17481# Naval Weapons Support Center, Crane, Ind. Applied Sciences Dept.
CALIBRATION OF PYROELECTRIC RADIOMETERS FOR INFRARED FLARE MEASUREMENTS Final Report, Mar. 1978 - Sep. 1979
William E. Parish and Carl E. Dinerman 1 Aug. 1981 41 p refs
(AD-A107648; NWSC/CR/RDTR-144) Avail: NTIS HC A03/MF A01 CSCL 14/2

This report describes a set of pyroelectric radiometers which have recently been set up, successfully checked out, and are now in use for infrared flare plume radiation measurements. These radiometers meet the criteria of system linearity, fast rise time, complete commercial availability (no modification of electronics required, for example), ambient temperature operation, and reasonably flat spectral response from the visible to mid-infrared (about 15 micrometers). The instruments are presently being used (with the addition of bandpass filters) in the 3.0-4.0, 3.0-5.0 and 4.3-5.0 micrometer regions. Calibration procedures for these radiometers are described. The basis of the calibration procedure is an Electrically Calibrated Pyroelectric Radiometer (ECPR) which is traceable to the National Bureau of Standards. The ECPR is used only as a laboratory calibration device, and is a different instrument than the set of pyroelectric radiometers used for measurement of flare radiation. The ECPR is used to calibrate a blackbody. The ECPR is fitted with the band filter identical to the filters to be used with each pyroelectric radiometer. The blackbody is then used to calibrate each pyroelectric radiometer. These measurements are plotted to obtain a voltage versus irradiance calibration curve for each band being used with the pyroelectric radiometer system. Author (GRA)

N82-17482# Spectron Development Labs., Inc., Costa Mesa, Calif.
DEVELOPMENT AND LABORATORY TESTING OF A THERMAL EMISSION VELOCIMETER FOR APPLICATION TO AN EROSION NOSE TIP TEST FACILITY Final Report, Jul. 1979 - Nov. 1980
James D. Trolinger and M. J. Houser Wright-Patterson AFB, Ohio AFWAL Aug. 1981 23 p refs
(Contracts F33615-76-C-3145; F33615-79-C-3030; AF Proj. 2404)
(AD-A107713; SDL-80-6526; AFWAL-TR-81-3080) Avail: NTIS HC A02/MF A01 CSCL 14/2

A thermal emission velocimeter concept was explored and a system was developed for use in measuring particle velocities up to 5,000 meters per second in a reentry erosion facility. The particles, ranging from 10 to 100 micrometers in diameter, are generated to study reentry nose tip erosion and ablation. The approach passively utilizes optical components of a laser transit anemometer coupled to a microprocessor data management system. The system was laboratory tested and has inherent characteristics which should produce quality data in the severe and noisy environment of a reentry test facility. The system sensitivity has been calculated to measure velocity of micrometer sized particles whose temperature are minimally 1700 K.
Author (GRA)

N82-17483# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
A DURABLE, INTERMEDIATE TEMPERATURE, DIRECT READING HEAT FLUX TRANSDUCER FOR MEASUREMENTS IN CONTINUOUS WIND TUNNELS Final Report, 1 Oct. 1980 - 30 Jun. 1981
C. T. Kidd AEDC Nov. 1981 66 p refs
(AD-A107729; AEDC-TR-81-19) Avail: NTIS HC A04/MF A01 CSCL 14/2

The design and development of a high durability, intermediate service temperature (< or = 600 F), direct reading transducer for the measurement of aerodynamic heating in the continuous wind tunnels of the von Karman Gas Dynamics Facility is described. This transducer operates on the axial temperature gradient or Schmidt-Boelter measurement concept. Considerable emphasis is placed upon the practical use of finite-element, two-dimensional heat conduction code for analysis of gage behavior rather than the indiscriminate use of invalid exact mathematical solutions. Laboratory evaluation and calibration of prototype transducers at ambient temperature levels varying from 70 to 500 F are discussed. Results of wind tunnel aerodynamic heating measurements using limited numbers of prototype Schmidt-Boelter gages are presented. Recommendations for future work efforts with regard to further development and testing of this measurement concept are discussed. Author (GRA)

N82-17484# ARO, Inc., Arnold Air Force Station, Tenn.
HYPERVELOCITY IMPACT INSTRUMENTATION DEVELOPMENT Final Report, 1 Oct. 1978 - 30 Sep. 1979
P. H. Dugger and R. E. Hendrix AEDC Nov. 1981 29 p refs
(AD-A107852; AEDC-TR-81-33) Avail: NTIS HC A03/MF A01 CSCL 19/4

The instrumentation capabilities of the Arnold Engineering Development Center (AEDC) von Karman Gas Dynamics Facility's (VKF) aeroballistic ranges have been expanded to facilitate studies of hypervelocity impact-related phenomena. Two instrumentation systems for characterizing clouds of debris resulting from impact have been developed and put to use: (1) An extremely high-speed sequential laser photography system provides photographic data describing debris cloud growth characteristics at framing rates from 10,000/sec to 10 to the 7th power/sec. This system can resolve debris particles as small as 0.0001 in. (2) X-ray shadowgraph systems with exposure times of 30 nsec can record debris velocity and mass data and can discern aluminum particles as small as 0.063 in. and steel particles as small as 0.031 in. Electromagnetic radiation generated by hypervelocity impact can be explored in a variety of ways. GRA

N82-17485# Los Alamos Scientific Lab., N. Mex.
SMALL SAMPLE ASSAY STATION USERS GUIDE
E. L. Adams, S. Bourret, and M. M. Meier Mar. 1981 26 p refs
(Contract W-7405-eng-36)
(LA-8731-M) Avail: NTIS HC A03/MF A01

A system for acquisition of delayed neutron data, based on an LSI-11 with 28 K words of memory, is described. Hardware features are a six channel scaler and level sensor to determine the state of the experiment; and normal peripherals include dual floppy disk drive, line printer, and CRT terminal. The software for experiment control and for the analysis of data is presented. The protocol for assays that optimally utilize the system is suggested. S.L.

N82-17486# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
LEGIBILITY OF CHARACTERS WITH DIFFERENT SEGMENTATIONS AND COLORS
Hans-Joachim Reinig 1981 5 p refs Presented at 1st European Display Res. Conf. Eurodisplay 81, Munich, 16-18 Sep. 1981 Sponsored by Deutsche Forschungsgeimschaft
Avail: NTIS HC A02/MF A01

The legibility of electronically presented information, e.g., public transport timetables, was tested. The minimal and the optimal legibility conditions of short words in 5X7 dot matrix and 14 line segment characters were compared with the legibility of continuous characters. The words were presented by screen projection with decreasing size of characters with fixed distance to the subject (minimum legibility). Optimal legibility was determined subjectively. The size of characters of negative contrast has to be increased by 20 compared with positive contrast. The 5X7 dot matrix characters are as legible as continuous letters. The 14 line segment characters must be presented 1.3 times higher for the same legibility. White characters on blue background were preferred by most subjects. Author (ESA)

N82-17487# National Bureau of Standards, Washington, D.C. Office of Weights and Measures.
SPECIFICATIONS, TOLERANCES, AND OTHER TECHNICAL REQUIREMENTS FOR WEIGHING AND MEASURING DEVICES, 1982 EDITION
Sep. 1981 224 p
(PB82-113952; NBS-HB-44-1982) Avail: NTIS HC A10/MF A01 CSCL 14B

The specifications, tolerances and other technical requirements published herein comprise, in their latest form, all of the current codes as adopted by the National Conference on Weights and Measures. The Conference Committee on Specifications and Tolerances, acting at the request of the Conference or upon its own initiative, prepares from time to time, with the cooperation of the National Bureau of Standards, proposed revisions, amendments, or additions to the material previously adopted by the Conference. Such revisions, amendments or additions are then presented to the Conference as a whole, where they are discussed by weights and measures officials and representatives of interested manufacturers and industries. Eventually the proposals of the Committee are voted upon by the weights and measures officials. All of the specifications, tolerances, and other technical requirements given herein are recommended by the National Conference on Weights and Measures for official promulgation in and use by the several states in exercising their control of commercial weighing amd measuring apparatus. A similar recommendation is made with respect to the local jurisdictions within a state in the absence of the promulgation of specifications, tolerance, and other technical requirements by a state agency. GRA

N82-17488# IIT Research Inst., Chicago, Ill.
DEVELOPMENT AND EVALUATION OF AN AMBIENT VIABLE MICROBIAL AIR SAMPLER
Kerby F. Fannin and Stanley C. Vana Sep. 1981 102 p refs Prepared in cooperation with Inst. of Gas Technology
(Grant EPA-R-805864)
(PB82-113689; EPA-600/1-81-069) Avail: NTIS HC A06/MF A01 CSCL 14B

Studies were performed to evaluate the suitability of cyclone scrubber samplers and a continuously wetted substate for detection of several types of microorganisms. The samples were evaluated in a dynamic aerosol chamber using all glass impingers as reference samplers. Comparison of a stainless steel and a glass cyclone scrubber samples for detecting Bacilius subtilis var. niger spore aerosols of about 1.1 to 3 micrometers count median diameter showed no significant differences in their relative collection efficiencies. Based upon ease of construction, present usage, and potential availability, the glass cyclone scrubber was selected for further evaluation. This sampler showed geometric mean relative collection efficiencies, for B. subtilis var. niger spore aerosols, of 52% and 68%, depending upon the composition of the disseminating fluid. Author

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-17489# Ballistic Research Labs., Aberdeen Proving Ground, Md.
APPLICATION OF A HIGH POWER LASER TO DEMILITARIZATION PROBLEMS Final Report
Ona R. Lyman Sep. 1981 34 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A106659; AD-E430684; ARBRL-TR-02360) Avail: NTIS HC A03/MF A01 CSCL 20/5

Attempts to experimentally cut rocket motors, puncture agent cavities, and perform other operations associated with demilitarization of munitions with a high power CO2 laser are discussed. Laser requirements are outlined and problems associated with laser operations contiguous with hazardous materials are highlighted. It is concluded that while the use of a CO2 laser of about 10 kilowatts output has advantages for some demilitarization operations, it is not practical for many. Author

N82-17490# Missouri Univ. -Rolla. Dept. of Physics.
KINETIC PROCESSES IN HIGH PRESSURE GASES: EXCITED STATE COLLISIONS Technical Report, Dec. 1980 - Dec. 1981
Laird D. Schearer 1 Dec. 1981 35 p refs
(Contract N00014-75-C-0477; NR Proj. 343-011)
(AD-A108128; TR-14) Avail: NTIS HC A03/MF A01 CSCL 20/5

A dense sodium vapor in a high pressure buffer of argon has been simultaneously excited by short (4 ns) laser pulses from two lasers: the first tuned to one of the D line transitions at 589 nm and the second tuned to the photoionization threshold of the 3p states near 406 nm. The temporal evolution of the system was studied with and without the photoionizing laser pulses. At early times (about 100 ns) excited state populations are determined by energy transfer collisions between two laser-excited 3p atoms while the ion/electron density is controlled by superelastic heating of seed electrons followed by electron impact ionization of excited state atoms. At late times (about 1 microsecond) excited state populations are controlled by collisional-radiative recombination processes. Excitation transfer rates into the 4d, 5d, 6d, and 6s levels are measured. The optical emission spectra of a recombining Na plasma is observed. The shift and broadening of the spectral line emission due to electron collisions is observed and the electron density calculated from shift measurements. The results agree well with electron densities obtained in the same system from Saha plots of excited state densities. Author (GRA)

N82-17491# Heriott-Watt Univ., Edinburgh (Scotland). Dept. of Physics.
SUBMILLIMETER LASER AND FABRY-PEROT SPECTROSCOPY USING METALLIC MESH Final Technical Report, Jun. 1978 - Jun. 1981
C. R. Pidgeon and B. W. Davis May 1981 79 p refs
(Contract DA-ERO-78-G-074; DA Proj. 1T1-61102-BH-57)
(AD-A107939) Avail: NTIS HC A05/MF A01 CSCL 20/5

An optically pumped submillimeter laser was constructed and investigated. Optical pumping with C-12O2-16 and isotopic C-13O2-16 were demonstrated. Using the isotopic (C-13)O2 laser 17 new submillimeter emissions were reported between 78.5 microns and 917 microns. The mode properties, stability,

and tuning characteristics of the CO2 laser were discussed. Such measurements were taken with heterodyne techniques. Cooling effects on the isotopic (C-13)O2 laser were described and resulted in increases in both the number of observed lines and output power from the laser. A high power CW CO2 laser was also described and used in the search for new submillimeter emissions. The submillimeter waveguide laser designed gave powers in excess of 1 mW throughout the submillimeter region. The design was flexible to permit a choice of coupling and waveguides of various sizes. Author

N82-17492# Connecticut Univ., Storrs. Inst. of Materials Science.
ELECTRON BEAM/LASER GLAZING OF IRON-BASE MATERIALS Annual Progress Report
Peter R. Strutt, B. G. Lewis, and M. Kurup Jul. 1981 100 p refs
(Contract N00014-78-C-0580)
(AD-A107559) Avail: NTIS HC A05/MF A01 CSCL 20/5

Research on directed energy source processing of hard-iron base materials demonstrates the effect of environment, alloy chemistry and processing parameters on the nature of the crystal structure, distribution, and compositional variation of phases. In molybdenum high speed steels, for example, it is found that segregation resulting from convective and turbulent flow during glazing may either result in large scale phase separation or compositional variation within a phase. Another example of the importance of processing conditions is a clear demonstration of the effect of small oxide particles in inducing martensite during laser processing. A detailed analysis has been made to determine the effect of deflection coil parameters on the distortion of surface area glazing patterns. This is particularly important in developing techniques for preparing uniform rapidly solidified layers. In studying molybdenum base high speed steels the value of the carbon content is found to be important in determining delta ferrite formation and the peritectic reaction of this phase to uniform austenite and carbide phases. In contrast to M2 (where the carbon concentration is 0.85wt%) a homogeneous gamma/alpha phase mixture forms in materials with a carbon content of > or = 1wt%, i.e. the alloys M7, and M42. However in these two materials combined convective and turbulent flow during glazing results in a significant composition variation of the refractory elements. Tempering largely removes this inhomogeneity and results in the formation of a homogeneous tempered martensite structure. A most important effect observed in M2, M7, and M42 was the shift to longer tempering times of material glazed at moderate to high beam velocities. GRA

N82-17493# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
NOTE ON PLANAR UNDULATOR WIGGLER SINGLE ELECTRON MOTION Final Report
Robert Cawley 15 Jun. 1981 26 p refs
(ZR00001)
(AD-A108051; NSWC/TR-81-227) Avail: NTIS HC A03/MF A01 CSCL 20/5

Single particle motion in a planar undulator wiggler free electron laser magnetic field configuration is set up and examined for the construction of invariants, preparatory to specifying beam equilibria for input to a Maxwell-Vlasov analysis. Two invariants are immediately available, the energy gamma and one component of transverse canonical momentum P sub y. In an effort to find a third invariant, or a basis of determination for an advantageous approximate third invariant, which can be associated with the axial periodicity of the field, a variable change having some interesting features is reported here. The axial motion between Z = + or infinity is converted to the oscillations of a particle in an infinitely long, axially reflecting box. The transit of a half-cycle of wiggler oscillation, absolute value of Delta Z = Pi/k sub 0, corresponds to a single bounce between Z = + or - infinity, where Z is the new coordinate. Transverse coordinates and velocities are continuous at each axial reflection from infinity. Author (GRA)

N82-17494# Battelle Columbus Labs., Ohio.
MOLECULAR INTERACTIONS WITH MANY-BODY PERTURBATION THEORY Final Report
Rodney J. Bartlett 11 Sep. 1981 82 p refs
(Grant AF-AFOSR-3661-78; AF Proj. 2301)
(AD-A107616; AFOSR-81-0694TR) Avail: NTIS HC A05/MF A01 CSCL 20/5

Very efficient computer codes to perform many body perturbation theory (MBPT) and coupled cluster method (CCM) calculations were written and employed for the first time in large scale ab initio calculations of potential energy surfaces. Author (GRA)

N82-17495# Aerodyne Research, Inc., Bedford, Mass. Center for Chemical Environmental Physics.
MEASUREMENT OF FLUORINE ATOM CONCENTRATIONS AND REACTION RATES IN CHEMICAL LASER SYSTEMS Annual Report, 23 Jul. 1980 - 23 Jul. 1981
Alan C. Stanton Sep. 1981 18 p refs
(Contract F49620-80-C-0100; AF Proj. 2301)
(AD-A108072; ARI-RR-272; AFOSR-81-0772TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

The line positions of two components of the fluorine atom ground state fine structure transition were measured with diode laser absorption spectroscopy, using a water vapor pure rotational line at 404.077/cm as a wavelength reference. These results imply a spin orbit splitting for fluorine of 404.142 + or - 0.01/cm. Further experiments planned in the program will provide data on the temperature dependent line broadening parameters for foreign gas broadening of the F atom transitions. In addition, F atom recombination rates will be studied using the diode laser measurements technique. It is anticipated that the results of this program will provide all data required for implementation of this technique as an in-situ F atom diagnostic in chemical laser systems. GRA

N82-17496# Kigre, Inc., Toledo, Ohio.
THE DEVELOPMENT OF A HIGH AVERAGE POWER GLASS LASER SOURCE Progress Report
30 Sep. 1981 4 p ref
(Contract N00014-81-C-2376)
(AD-A107582) Avail: NTIS HC A02/MF A01 CSCL 20/5

During September, 1981, the majority of the effort expended was concerned with the tailoring of the pump-window filter and the acquisition of the necessary re-draw equipment. We are also submitting a special report on the fluorescent pumping aspects of the filter development. The specific activities occurring are delineated per their respective task as follows: Q-100 Property Measurement; The Cladding of Q-100; Selective Filtering and/or Energy Transfer to Reduce Thermal Loading; Glass Strengthening, and Alternate Pump Sources. GRA

N82-17497# Kigre, Inc., Toledo, Ohio.
THE DEVELOPMENT OF A HIGH AVERAGE POWER GLASS LASER SOURCE Progress Report
John D. Myers 31 Aug. 1981 3 p
(Contract N00014-81-C-2376)
(AD-A107583) Avail: NTIS HC A02/MF A01 CSCL 20/5

During August, 1981, work was concentrated primarily in the area of selective filtering. Dr. Rapp has been retained as a consultant. His credentials are impeccable; he is the inventor of ED-2 and other silicate and phosphate laser glass. He also has extensive research experience in rare-earth doped glasses, sensitization schemes, and other such areas of quantum electronics and glass science. The same format dealing with the following efforts: (1) Q-100 Property Measurements; (2) the Cladding of Q-100; (3) Selective Filtering and/or Energy Transfer to reduce Thermal Loading; (4) Glass Strengthening; and (5) Alternate Pump Sources. GRA

N82-17498# Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.
A 16 MUON CO2 BENDING MODE LASER SYSTEM
W. H. Kasner (Westinghouse Research and Development Center, Pittsburgh, Pa.), V. A. Toth (Westinghouse Research and Development Center, Pittsburgh, Pa.), and M. A. Akerman 2 Jun. 1981 19 p ref Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10 Jun. 1981
(Contract W-7405-eng-26)
(DE81-030123; K/ET-5023; CONF-810613-11) Avail: NTIS HC A02/MF A01

A 16 bending mode laser system yielding output energies

of 40 to 50 mJ/pulse is described. This system uses resistor ballasted pin-pin electrodes and transverse pulsed electrical discharge excitation of cold C2:N2:He gas mixtures. DOE

N82-17499# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SOME RESULTS OF NUMERICAL EXPERIMENTS ON THE COMPUTATION OF THE KOOTWIJK AND WETTZELL SATELLITE LASER RANGING STATION COORDINATES
K. F. Wakker and B. A. C. Ambrosius Sep. 1981 11 p refs Presented at 4th LAGEOS Working Group Meeting, Greenbelt, Maryland, Sep. 1981
(VTH-M-409) Avail: NTIS HC A02/MF A01

Results from a study of the effects on orbital and parameter solution of spatial, temporal, and geographical distribution of laser ranging data are presented. Data arcs from LAGEOS, Starlette and GEOS 3 are summarized. The LAGEOS solution for the Wettzell coordinates is unaffected by the selection of gravity model. The Starlette estimate varies by several meters. The best GEOS 3 result is obtained using GEM 10 B. Wettzell is placed 17m eastward of the Modified New Orleans coordinate estimate. The LAGEOS solution for the Kootwijk-Wettzell baseline agrees well with other solutions. Author (ESA)

N82-17500# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PRELIMINARY RESULTS OF SEASAT ORBIT DETERMINATIONS FROM LASER RANGE AND EUROPEAN DOPPLER RANGE-RATE OBSERVATIONS
K. F. Wakker, B. A. C. Ambrosius, and T. vanderPloeg Sep. 1981 19 p Presented at 4th LAGEOS Working Group Meeting, Greenbelt, Md., Sep. 1981
(VTH-M-411) Avail: NTIS HC A02/MF A01

A Seasat data arc is analyzed in order to: gain experience in computing accurate orbits from laser ranging data; assess gravity and surface force model accuracy; determine the positions of five European Doppler stations relative to a global NASA ground station coordinate solution; and study the effects of European Doppler range-rate data on the orbital solution. The PGS S3 and S4 models yield better results than GEM 9 or GEM 10B. More data must be analyzed since one arc is not representative, especially considering that orbital coverage in that arc is not good. Author (ESA)

N82-17501# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
KALMAN FILTER SATELLITE ORBIT IMPROVEMENT USING LASER RANGING MEASUREMENTS FROM A SINGLE TRACKING STATION
K. F. Wakker and B. A. C. Ambrosius Sep. 1981 18 p refs Submitted for publication Sponsored by Ministry of Education and Delfts Hogenshoolfonds
(VTH-M-414) Avail: NTIS HC A02/MF A01

The accuracy of a computer program (SORKA) which uses the laser range observations acquired at one tracking station in order to provide real time position prediction updates during a pass is assessed. The program is compared with a GEODYN GEOS 1 orbit solution. State vector differences are interpreted as SORKA estimate errors and are transformed into errors in the classical orbital elements as well as into radial, cross track and along track errors. The program was also applied to simulated GEOS 3 data. Results are presented for three GEOS 1 passes. Total position errors before the processing of the first observation of the second and third pass, (primarily errors in cross track and along track direction) are so small that at the first laser firings during the second and third pass the satellite is within the laser beam. Author (ESA)

N82-17502# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
INVESTIGATION OF D2O LASER EMISSION AT 50, 66, 83, 111, AND 116 MICRONS
G. Dodel and N. G. Douglas Aug. 1981 37 p refs Submitted for publication Sponsored in part by German Academic Exchange Service
(IPF-81-6) Avail: NTIS HC A03/MF A01

The far IR laser transitions in D2O, pumped by the 9P(32) line of a multimode CO2 TEA laser, were investigated. A line at 111 microns is reported. The spectral properties of the strongest lines (66, 111, 116 microns) were studied. Strong frequency pulling at 66 microns was observed. Suppression of axial modes was below that required, e.g., by a heterodyne Thomson scattering experiment. The 50 micron transition exhibits an unexplained afterpulsing at low pressures. At 111 microns a double pulse seen at certain pressures is attributed to the double nature of the transition. The dominant component displays a smooth pulse shape, making it suitable for Thomson scattering applications if it can be scaled to the necessary power level. Author (ESA)

N82-17503 American Univ., Washington, D. C.
INVESTIGATION OF A CASCADE LASER SYSTEM: THE EXCITATIONS AND INTERACTIONS OF N SUB 2 IN THE ULTRAVIOLET AND THE NEAR INFRARED Ph.D. Thesis
John Slaven Kruger 1981 276 p
Avail: Univ. Microfilms Order No. 8125428

Optical Interactions between electronic vibrational states of the diatomic N2 molecule are studied. Laser oscillation in N2 occurs quite readily in electrical discharges on an ultraviolet and a near infrared (IR) system of emission bands, among others. While the mechanisms that produce population inversions for the uv oscillation have previously been established for the most part, the dominant mechanisms for the IR bands were not at all certain. Specific information about N2 as a lasing material was sought. It was determined that the IR laser transitions are excited partly through a cascade involving UV laser transitions. A concise theory of cascade interactions and excitations was developed to predict both spontaneous and stimulated emission strengths. A more sophisticated theory which took the electron energy distribution of the laser's excitation into account was used to predict spectra. The typical 3 level rate equation theory was extended for a pulsed laser application to a 4 level system including cascade. This research concluded that the Frank-Condon Principle is a powerful quantitative tool for analyzing interactions. Dissert. Abstr.

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-17504# National Aerospace Lab., Tokyo (Japan).
AN INVESTIGATION OF THE EARLY DETECTION OF DEFECTS IN BALL BEARINGS BY THE VIBRATION MONITORING
Shoji Hoshiya, Katsumi Seki, Kenji Nishio, and Toshio Miyachi Jul. 1981 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-675; Rept-2; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Utilizing a life test rig for rolling element bearings, the time histories of the vibration of grease lubricated test ball bearings were monitored. Vibration was detected by a piezoelectric accelerometer mounted on the bearing housing and was recorded by a magnetic tape recorder which was controlled by a microcomputer. In total, twenty-seven bearings were tested, and flaking failures were generated in twenty-six of them; nineteen on the outer races, five on the inner races and two on the balls. In most cases, flakings grew gradually with obvious changes of vibration, thus enabling the early detection of the defects in the bearings. However, in some bearings, flakings were generated very rapidly, limiting the usefulness of the condition monitoring. Author

N82-17505# Texas Research Inst., Inc., Austin.
THE APPLICATION OF MECHANICAL CLAMPS TO PORTSMOUTH CONNECTORS Final Report
D. E. Glowe and S. L. Arnett 23 Nov. 1981 73 p
(Contract N00173-79-C-0129)
(AD-A107632; NRL-MR-4602) Avail: NTIS HC A04/MF A01 CSCL 13/9

The efficiency of mechanical clamps applied to the molded boot of the MIL-C-24231 (Portsmouth) underwater connector was investigated. A mission profile for underwater connectors was prepared and used to design laboratory test sequences to evaluate connector leakage. A test connector was designed that

incorporated the important features of the Portsmouth connector with the addition of leakage monitors in the construction so that leakage paths in the connector could be identified during test. Construction variables of polyurethane or neoprene boots, both bonded and unbonded, clamp design and shielded or unshielded cable were investigated using factorial experimental design and analysis. A preferred clamped connector configuration was determined. Preferred test connectors were manufactured using bonded neoprene boots, shielded cable and Band-It Preform clamps and compared to a standard non-clamped polyurethane connector in accelerated life testing. It was determined that a mechanical clamp inhibits leakage in a connector. Although applying a clamp to a connector does not insure water-tight integrity, it was found that after 32 weeks of accelerated life testing, 78% fewer clamped connectors leaked than the control unclamped connectors. The data also indicated that neoprene and polyurethane bonds degrade with time but connectors made with neoprene molded boots were less likely to leak through a bond interface than those made with polyurethane molded boots. GRA

N82-17506# Systems Control, Inc., Anaheim, Calif.
INITIAL ASSESSMENT OF SELECTED ADVANCED LUBRICATING OIL FILTERS
D. Hilyard Sep. 1981 31 p refs
(Contract DE-AC19-80BC-10256)
(DE82-002420; DOE/BC-10256/1) Avail: NTIS HC A03/MF A01

The potential effectiveness of advanced oil filters that claim to re-refine the oil on-board a vehicle or claim either never-drain or extended drain benefits is discussed. It was concluded that so-called re-refining filters do not actually re-refine in-service motor oil nor do they prevent depletion of additives. It was also concluded that these advanced filters may remove particles smaller than a standard oil filters removes, but the benefits are questionable. DOE

N82-17507# CLD Group, Inc., Ventura, Calif.
FIELD DEMONSTRATION OF THE CONVENTIONAL STEAM DRIVE PROCESS WITH ANCILLARY MATERIALS Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Ron Bowman Oct. 1981 133 p refs
(Contract DE-FC03-79SF-10761)
(DE82-003040; DOE/SF-10761/1; AR-1) Avail: NTIS HC A07/MF A01

The applicability of foams to achieve mobility control and/or permeability reduction of injected steam in steam drive operations was tested. Foam chemicals were screened for thermal stability and the foam systems in porous media were emplaced. The compatibility of the emplacement techniques and the capacity of the chemical system to achieve a significant measure of mobility control over injected steam was verified. The two major reservoir problems in steam drive operations are addressed: the flow of steam through thief zones or other channels that exist at the outset of initiating operations, and the progressive increase in channelling of steam through the oil depleted, steam swept zone. DOE

N82-17508# Consolidated Controls Corp., El Segundo, Calif.
DESIGN, FABRICATION, AND EVALUATION OF A SPIRAL-FLOW LETDOWN VALVE Final Report
H. J. Balhouse Sep. 1981 68 p refs
(DE82-900863; EPRI-AP-2044) Avail: NTIS HC A04/MF A01

A letdown valve with spiral-flow trim designed for coal liquefaction plant service was designed and tested. Letdown valves in these plants have tended to fail in a very short time due to rapid erosion of the valve trim. In the spiral-flow design, erosion is reduced by keeping velocity at a low, constant level through friction loss in a long spiraling flow path. In a field test at the SRC-1 pilot plant, the valve controlled the processes flow for over 34 hours before it became inoperative as a result of plugging due to accumulation of solids in operational areas. It is concluded that in order to realize the potential advantages of the spiral-flow concept, more development effort is needed in the areas of prevention of plugging and the application of erosion-resistant materials and coatings. Directions for future work in these areas, plus application of the concept to a non-cavitating liquid letdown valve and other pressure reduction devices, are discussed. DOE

N82-17509# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL ENGINEERING DEPARTMENT TECHNICAL REVIEW
R. B. Carr, ed. and R. M. Denney, ed. 1 Jan. 1981 109 p refs
(DE82-000303; UCRL-50016-81-1) Avail: NTIS HC A06/MF A01

Mechanical engineering and technical expertise are provided to prepare and field nuclear tests and to conduct analytical and experimental studies involving nuclear safety in general and seismic response of reactors in particular. Mechanical engineering services are also provided for spill effects testing at China Lake and NTS under liquified gaseous fuels program. S.L.

N82-17510# Technische Hogeschool, Delft (Netherlands). Lab. for Machine Elements and Tribology.
FLING-OFF COOLING OF STRAIGHT SPUR GEARS
G. J. J. vanHeijningen Nov. 1981 47 p refs In DUTCH; ENGLISH summary
(WTHD-136) Avail: NTIS HC A20/MF A01

For straight spur gear teeth, withdrawal of friction generated heat from the meshing zone was investigated. Fling-off cooling techniques include conventional intermittent cooling where oil is supplied to each tooth face once per revolution of the gear. This involves a sequence of intermittent, transient forced heat convection processes. Fling-off cooling through continuous supply of oil at the roots of the gear teeth faces, e.g., through holes connecting with a manifold inside the wheel rim, also exists in contrast to continuous fling-off cooling where root supply occurs naturally through impingement of comparatively cool droplets from oil mist in the gear casing. Theory and experiment show that in intermittent cooling even moderate supply rates of gear oil to the teeth faces suffice for attaining the limiting cooling capacity inherent in the conventional centrifugal fling-off process, except for heavy-duty gears. The cooling potential of both continuous methods is examined and compared with intermittent cooling. Author (ESA)

N82-17511# European Space Agency, Paris (France).
MAGNETIC BEARING REACTION WHEEL TESTS
L. Torres Nov. 1981 25 p Transl. into ENGLISH of "Essais d'une Roue a Reaction a Paliers Magnetiques" Rept. CNES-80/CT/PRT/SST/162 Brunswick Original report in FRENCH previously announced as N81-20444
(ESA-TT-699; CNES-80/CT/PRT/SST/SS/162) Avail: NTIS HC A02/MF A01

Torque measurements on a scale model of a SPOT satellite type, three axis stabilization reaction wheel were made. The sensing scheme of the command electronics and calibration of the tachometer are described. Counter-rotation torque is measured off the wheel axis of rotation. Characterization of the wheel bearings is emphasized. The magnetic bearing field configuration is shown, and transversal stiffness measurement of the rotor, high speed (2700 r.p.m.) friction torque measurement around the wheel axis of rotation, and measurement of the magnetic bearing torque at very low spin rate are depicted. Measurement results are presented. Author (ESA)

N82-17512# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
ROLLING RESISTANCE MEASUREMENTS 106 PASSENGER CAR TIRES
Gayle Klemer Aug. 1981 44 p refs
(PB82-116625; EPA-AA-SDSB-81-3) Avail: NTIS HC A03/MF A01 CSCL 13F

A diverse range of tires currently available on the replacement passenger car tire market is investigated. One hundred-six tires from fifty different lines were tested. The rolling resistance of these tires are analyzed against other tire characteristics (tire construction, new versus retread, etc.) to gain insight as to the effects of these characteristics on vehicle fuel economy. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-17513 British Aerospace Aircraft Group, Warton (England). Materials and Development Dept.
THE ULTRASONIC INSPECTION OF C.F.C.
R. Wilson 7 Jul. 1981 12 p
(MDR-0465) Avail: Issuing Activity

Four carbon fiber composite sine wave spars, produced using various manufacturing techniques, were inspected ultrasonically. Procedures used for examining the web and the flanges are described. A quality representative test piece must be produced containing artificial defects of a known size in order to further NDI development work on these spars. A.R.H.

N82-17514*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
ULTRASONIC AND MECHANICAL CHARACTERIZATIONS OF FATIGUE STATES OF GRAPHITE EPOXY COMPOSITE LAMINATES Final Report
James H. Williams, Jr., Hursit Yuce, and Samson S. Lee Washington NASA Jan. 1982 26 p refs
(Grant NsG-3210)
(NASA-CR-3504) Avail: NTIS HC A03/MF A01 CSCL 20K

Eight-ply (0, + or - 45, 0)s laminates of Hercules AS/3501-6 graphite epoxy composite are fabricated using various cure pressures ranging from 0.52 to 0.86 MPa and cure temperatures ranging from 150 C to 200 C. In general, the minimum composite void volume fraction is obtained at a cure temperature of 175 C and a cure pressure of 0.86 MPa, or at 200 C and 0.86 MPa. The ultrasonic attenuation at 4 MHz was found to correlate with the composite void volume fraction. Composite specimens were tested in flexural fatigue. Beyond 10,000 fatigue cycles, the ultrasonic attenuation at 4 MHz was found to increase and the flexural stiffness was found to decrease. The ultrasonic attenuation at 4 MHz of the as-fabricated composite can be correlated with the number of fatigue cycles to failure. Author

N82-17515# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
COMPARISON BETWEEN RELIABILITY, SENSITIVITY AND ACCURACY OF NONDESTRUCTIVE INSPECTION METHODS
Eric A. B. deGraaf and Paul deRijk 31 Mar. 1981 15 p refs Presented at 13th Symp. on Nondestructive Evaluation, San Antonio, 21-23 Apr. 1981
(NLR-MP-81009-U) Avail: NTIS HC A02/MF A01

A number of inspection methods in frequent use were applied to one hundred aluminium specimens fabricated purposely by the NLR, as well as to more than 220 rejected steel components of real aircraft undercarriages. It is shown that there exists a fair amount of scatter between the results of different techniques and inspectors and also between subsequent inspections by one inspector. Corrosion has a significant influence on reliability, sensitivity, and accuracy. The results of the ultrasonic inspections turn out to be rather disappointing, whereas the results of penetrant inspections tend to depend rather heavily on the specimen configuration. Fluorescent penetrant performs far better than red penetrant. Eddy current gives good moderate results. On the steel components fluorescent magnetic ink as well as magnetic rubber achieve by far the best results, at the penalty of a fair amount of spurious indications. A.R.H.

N82-17516# Missouri Univ. -Columbia. Dept. of Statistics.
ACCELERATED LIFE TESTING UNDER COMPETING EXPONENTIAL FAILURE DISTRIBUTIONS
John P. Klein and Asit P. Basu Jul. 1981 29 p Prepared in cooperation with Ohio State Univ., Columbus
(Contract N00014-78-C-0655)
(AD-A107626; TR-108) Avail: NTIS HC A03/MF A01 CSCL 12/1

Accelerated life testing of a product is commonly used to estimate parameters of devices with extremely long lifelines. The problem of analyzing accelerated life tests when the product can fail from any one of p independent causes is considered. For each component it is assumed that the time to failure distribution is exponential with a hazard rate which follows a 'power rule.' The method of maximum likelihood is used to obtain estimators of the power rule parameters when the life test is either type I, type II, or progressively censored. Estimators of each component's mean failure time and survival function are obtained. Estimators of system or subsystem survival functions are also obtained. Results of a simulation study are presented. Author (GRA)

N82-17517# Florida State Univ., Tallahassee. Dept. of Statistics.
STATISTICAL ASPECTS OF RELIABILITY, MAINTAINABILITY AND AVAILABILITY Final Report, 1 Sep. 1980 - 31 Aug. 1981
Myles Hollander and Frank Proschan Oct. 1981 8 p refs
(Grant AF-AFOSR-0038-81; AF Proj. 2304)
(AD-A107618; AFOSR-81-0728TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The main thrust of the research was in the development of methods and concepts in reliability, availability, and maintainability, presently applicable and potentially applicable to the programs of the Air Force in particular and the Department of Defense in general. In addition, because of the general nature of the mathematical and statistical research performed, the results obtained are of value in a variety of other applied areas, and in mathematical and statistical theory. Author (GRA)

N82-17104# Boeing Military Airplane Development, Seattle, Wash. Digital Flight Controls Research Dept.
STAGE-STATE RELIABILITY ANALYSIS TECHNIQUE
Alan D. Stern *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-17518 British Aerospace Aircraft Group, Warton (England). Materials and Development Dept.
AN ELECTRICAL METHOD FOR THE MONITORING OF FATIGUE CRACK GROWTH
M. J. Sanders 8 Jul. 1981 9 p
(BAe-MDR-044) Copyright. Avail: Issuing Activity

Due to increasing demand for crack propagation data an electrical potential method for crack growth monitoring was developed for constant amplitude and Falstaff loaded specimens. The use and limitations are discussed. Author

N82-17519*# Boeing Aerospace Co., Seattle, Wash.
DESIGN, FABRICATION AND TEST OF GRAPHITE/POLYIMIDE COMPOSITE JOINTS AND ATTACHMENTS FOR ADVANCED AEROSPACE VEHICLES Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
Hampton, Va. NASA. Langley Research Center Jul. 1981 62 p refs
(Contract NAS1-15644)
(NASA-CR-159115; QTPR-8) Avail: NTIS HC A03/MF A01 CSCL 20K

The development of several types of graphite/polyimide (GR/PI) bonded and bolted joints is reported. The program consists of two concurrent tasks: (1) design and test of specific built up attachments; and (2) evaluation of standard advanced bonded joint concepts. A data base for the design and analysis of advanced composite joints for use at elevated temperatures (561K (550 deg F)) to design concepts for specific joining applications, and the fundamental parameters controlling the static strength characteristics of such joints are evaluated. Data for design and build GR/PI of lightly loaded flight components for advanced space transporta-

tion systems and high speed aircraft are presented. Results for compression and interlaminar shear strengths of Celion 6000/PMR-15 laminates are given. Static discriminator test results for type 3 and type 4 bonded and bolted joints and final joint designs for TASK 1.4 scale up fabrication and testing are presented. E.A.K.

N82-17520*# Engineering Information Systems, Inc., San Jose, Calif.
SPAR REFERENCE MANUAL UPDATE SPAR LEVEL 15 Final Report
W. D. Whetstone Mar. 1980 233 p refs
(Contract NAS8-32664)
(NASA-CR-161967; EISI/A2200-Rev-4) Avail: NTIS HC A11/MF A01 CSCL 20K

Command runstream elements are presented for analyzing structural systems that are composed of a number of cyclically symmetrical sectors. Provisions are included for systems in which each cyclically symmetrical sector also possesses a plane of reflective symmetry. The following types of analysis may be performed: static analysis with and without preload, vibrational analysis with and without preload, and buckling analysis with and without preload. S.L.

N82-17521*# Battelle Columbus Labs., Ohio.
STRESS EVALUATIONS UNDER ROLLING/SLIDING CONTACTS Final Report
J. W. Kannel and J. L. Tevaarwerk 30 Oct. 1981 54 p refs
(Contract NAS3-22808)
(NASA-CR-165561; G7782) Avail: NTIS HC A04/MF A01 CSCL 20K

The state of stress beneath traction drive type of contacts were analyzed. Computing stresses and stress reversals on various planes for points beneath the surface were examined. The effect of tangential and axial friction under gross slip conditions is evaluated with the models. Evaluations were performed on an RC (rolling contact) tester configuration and it is indicated that the classical fatigue stresses are not altered by friction forces typical of lubricated contact. Higher values of friction can result in surface shear reversal that exceeds the stresses at the depth of maximum shear reversal under rolling contact. E.A.K.

N82-17522*# Grumman Aerospace Corp., Bethpage, N.Y.
AN INVESTIGATION OF DYNAMIC-ANALYSIS METHODS FOR VARIABLE-GEOMETRY STRUCTURES Final Report
Fred Austin Dec. 1980 280 p refs
(Contract NAS9-15895)
(NASA-CR-167498; CSS-SSS-RP002) Avail: NTIS HC A13/MF A01 CSCL 20K

Selected space structure configurations were reviewed in order to define dynamic analysis problems associated with variable geometry. The dynamics of a beam being constructed from a flexible base and the relocation of the completed beam by rotating the remote manipulator system about the shoulder joint were selected. Equations of motion were formulated in physical coordinates for both of these problems, and FORTRAN programs were developed to generate solutions by numerically integrating the equations. These solutions served as a standard of comparison to gauge the accuracy of approximate solution techniques that were developed and studied. Good control was achieved in both problems. Unstable control system coupling with the system flexibility did not occur. An approximate method was developed for each problem to enable the analyst to investigate variable geometry effects during a short time span using standard fixed geometry programs such as NASTRAN. The average angle and average length techniques are discussed. A.R.H.

N82-17523# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
APPLICABILITY OF LINEAR ELASTIC FRACTURE MECHANICS TO RIGID PVC PIPE MATERIALS
A. Y. Darwish, J. F. Mandell, and F. J. McGarry Feb. 1981 22 p refs
(MIT-RR-R81-1) Avail: NTIS HC A02/MF A01

The results presented support the use of linear elastic fracture mechanics when validity criteria similar to those used for metals are applied. Failure to consider test validity may yield meaningless results in many cases. Razor blade precracking produces acceptable crack tips under these test conditions. The room temperature behavior of polyvinyl chloride (PVC) specimens in the size range tested varies from notch insensitive to K sub Ic controlled when the displacement rate is varied by 2 to 3 orders of magnitude. L.F.M.

N82-17524# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
APPLICABILITY OF PLANE STRAIN FRACTURE TOUGHNESS TESTING TECHNIQUES TO POLYETHYLENE PIPE MATERIALS
D. R. Roberts, J. F. Mandell, and F. J. McGarry Apr. 1981 28 p refs
(MIT-RR-R81-3) Avail: NTIS HC A03/MF A01

Medium density polyethylene samples were tested to determine the applicability of plane strain fracture toughness testing techniques. Variables such as notch shape, notch root radius, and specimen thickness was studied to determine empirically what requirements exist for each. Temperature and loading rate were also varied. Higher temperatures and slower loading rates fracture is controlled by the yield strength of the material. At lower temperatures and faster loading rates fracture is toughness controlled. In this latter regime valid fracture toughness measurements can be made. Predictions from these tests of burst pressure of notched, 250 mm diameter pipe were verified in large scale burst tests. S.L.

N82-17525# Helsinki Univ. of Technology, Espoo (Finland). Lab. of Metal Working and Heat Treatment.
NECKING, FRACTURE AND LOCALIZATION OF PLASTIC FLOW IN METALS Ph.D. Thesis
A. S. Korhonen 1981 51 p refs
Avail: NTIS HC A04/MF A01

The basic equations of the mechanics of matter are reviewed, and examples of different constitutive equations presented. The application of the basic equations in plasticity is then discussed in more detail with special reference to the problem of localization of plastic flow. The criteria for diffuse and localized necking are presented and the possibility of delaying the necking and obtaining large uniform and limit strains is then discussed. The possibilities of applying the necking criteria in hydraulic bulging and in deep drawing are also considered. The possibility of explaining the observed ductile fracture patterns in plan stress, plane strain and under axial symmetry is studied and a qualitative agreement is found in all cases. N.W.

N82-17526# Southampton Univ. (England). Inst. of Sound and Vibration Research.
SOME ASPECTS OF THE NONLINEAR VIBRATIONS OF A CLAMPED-CLAMPED ALUMINIUM BEAM AND COMPARISON WITH A CARBON FIBER REINFORCED PLASTIC BEAM
M. M. K. Bennouna Mar. 1980 250 p refs
(ISVR-TR-108) Avail: NTIS HC A11/MF A01

The nonlinear vibration of a carbon fiber reinforced plastic beam and a clamped-clamped aluminium beam, due to large deflections of the order of double the beams thickness is examined and compared. The frequency response approach is used to study the damping and stiffness at large amplitudes. The fundamental mode shape is examined and curve fitting via polynomial approximation is used to determine the effect of large amplitude vibrations on the mode shape and its first and second derivatives. The effect of vibration amplitude is investigated via numerical integration. The harmonic distortion of flexural deflection and its effect on the mode shape estimation is examined. The bending strain, axial strain and total strain due to static loading at large deflections are examined at several stations along the length of the beam. Their harmonic distortion is also investigated as a function of position along the beam and at large deflections. A comparison between measured dynamic strains and those predicted from a simple theoretical model showed reasonable agreement between the two cases. R.J.F.

N82-17527# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
OXIDE FORMATION INSIDE A CYCLICALLY LOADED CRACK AND ITS EFFECT ON ENVIRONMENTAL ENHANCED CRACK GROWTH RATE IN 93 C WATER

G. Gabetta and C. Fossati 1981 27 p refs Presented at IAEA Specialists' Meeting on Subcritical Crack Growth, Freiburg, West Germany, 13-15 May, 1981
(Contract ISMAT-900)
(CISE-1705) Avail: NTIS HC A03/MF A01

Tests were performed in demineralized water at 93 C on pressure vessel steel with the purpose of obtaining crack growth rate data and information on the environmental mechanisms at two different temperatures. The effect of the oxygen content in water was studied; two oxygen concentrations were chosen, deoxygenated water and oxygen saturated water. Results show that an oxide layer forms inside the crack at the higher oxygen concentration and that the oxide layer causes a kind of 'crack closure'. A few thousand cycles are necessary for the formation of a detectable oxide layer. The oxide formation is probably related to the deformation rate at the crack tip. R.J.F.

N82-17528# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
DYNAMIC ELASTIC-PLASTIC CHARACTERIZATION OF NUCLEAR PRESSURE VESSEL MATERIAL
G. Angelino and C. Fossati 1981 12 p refs Presented at 5th Intern. Conf. on Fracture, Cannes, France, 29 Mar. - 3 Apr. 1981
(Contract ISMAT-900)
(CISE-1693) Avail: NTIS HC A02/MF A01

A test and instrumentation, which both extend the Charpy specimen performances, are introduced. Ability of the test to predict material parameters is demonstrated. J.M.S.

N82-17529# Pacifica Technology, Del Mar, Calif.
IMPLEMENTATION OF ANISOTROPIC AND NONLINEAR THERMAL STRESS MODELS IN ADINA 78 Final Report, Aug. 1980 - Feb. 1981
Robert S. Dunham and Dale E. Ranta Aug. 1981 78 p refs
(Contract N00173-80-C-0385)
(AD-A108085; PT-U81-0489-Rev-1) Avail: NTIS HC A05/MF A01 CSCL 13/13

This report describes the improvements made to the ADINA 78 finite element computer codes in order to permit the solution of structural response problems involving very rapid heating. A material model was added to the two- and three-dimensional continuum element types which permits the modeling of temperature dependent thermoelastic anisotropic material properties. A different material model was also added for these same continuum element types which permits the modeling of strain and temperature dependent thermoelastic anisotropic material properties. A major goal of this work was to render ADINA 78 operational on the ASC computer at the Naval Research Laboratories as well as to improve the computational efficiency of the code by vectorizing the most important loops. This work and various benchmark test cases are also described.
Author (GRA)

N82-17530# PDA Engineering, Santa Ana, Calif.
PATCHES-3. USER'S MANUAL Technical Report, Oct. 1978 - Apr. 1981
E. L. Stanton and L. M. Crain Edwards AFB, Calif. AFRPL Aug. 1981 219 p refs
(Contract F04711-78-C-0082; AF Proj. 3059)
(AD-A107709; PDA-TR-1437-00-01; AFRPL-TR-81-42) Avail: NTIS HC A10/MF A01 CSCL 13/13

PATCHES-III is a computer program for the analysis of general three-dimensional composite structures and materials. The program constructs solid geometry models and material distribution models using parametric cubic basis functions. Available finite elements range from the 64 node CCC element to the 4 node LLX element for axisymmetric models. The User's Manual is the dictionary or archive source for definitions of all available program options. The program determines the linear elastic response of fully anisotropic composites to thermal loads, mechanical loads and imposed displacements. Author (GRA)

N82-17531# George Washington Univ., Washington, D.C. Inst. of Management Science and Engineering.
A CLOSED FORM LOCAL SOLUTION OF A NONLINEAR STRUCTURAL DESIGN PROBLEM IN TERMS OF THE DESIGN PARAMETERS Scientific Report
Anthony V. Fiacco and Abolfazi Ghaemi 10 Aug. 1981 27 p refs
(Contract N00014-75-C-0729; NR Proj. 347-020)
(AD-A107669; SERIAL-T-449) Avail: NTIS HC A03/MF A01 CSCL 13/13

Using the results of previous analysis of the corrugated bulkhead model, a closed form of the optimal solution of this model is easily derived as a function of the many design parameters. The analytic solution is valid over large changes in the parameters. This demonstrates the possibility of making very accurate (in this instance, exact) local estimates of a markedly nonlinear parametric solution, once one solution is found, even though the original problem statement might appear to make this prohibitive. It is shown that the local parametric solution obtained can be extended to include large changes in the parameters, particularly when the parametric perturbations are restricted and highly structured, as is typical in practical applications. Aside from the practical value of such a result, it is reported because this problem is well publicized and has been utilized for some time as a test problem. Knowledge of the precise solution for a range of parameter values provides ideal information for further studies. Author (GRA)

N82-17532# Iowa Univ., Iowa City. Div. of Materials.
DISTRIBUTION THEORETIC METHODS FOR DYNAMIC ANALYSIS AND OPTIMIZATION OF MECHANISMS WITH INTERMITTENT MOTION Final Report
Edward J. Haug and Roger A. Wehage 1 Nov. 1981 9 p refs
(Contract DAAG29-79-C-0221)
(AD-A108021; ARO-16635.4-M) Avail: NTIS HC A02/MF A01 CSCL 20/11

A computer aided dynamic and design sensitivity analysis technique for planar dynamic systems undergoing intermittent motion is developed and applied. Planar dynamic systems made up of multiple rigid bodies connected by joints and force elements are modeled. A constrained dynamic system approach that accounts for discontinuous velocities associated with impulsive loading and impact between bodies is developed. A new numerical integration technique for mixed differential and algebraic equations that automatically defines and integrates for independent generalized coordinates has been developed. It has demonstrated an order of magnitude improvement in computing efficiency compared to preceding techniques. Intermittent motion dynamic effects due to impulsive loading or impact have been incorporated into the dynamic simulation, using a pieced interval dynamic analysis technique in which momentum balance relations are used to determine discontinuities in velocity at logical event times. This technique has been demonstrated on multibody, multiple contact point applications in mechanisms and automatic weapons. To assist in design optimization of mechanical system dynamics an adjoint variable design sensitivity analysis technique has been developed for calculation of first and second order derivatives of dynamic response with respect to design. Numerical calculations have demonstrated that accurate first and second derivatives can be obtained for moderate scale dynamic systems. Author (GRA)

N82-17533# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structural Integrity Branch.
EVALUATION OF SEVERAL BONDING PARAMETERS ON THE RANDOM BENDING FATIGUE LIFE OF ADHESIVELY BONDED ALUMINUM JOINTS Final Report, Jun. 1978 - Nov. 1980
Howard F. Wolfe, Carl L. Rupert, and Herbert S. Schwartz Aug. 1981 57 p refs
(AF Proj. 2401)
(AD-A107995; AFWAL-TR-81-3096) Avail: NTIS HC A04/MF A01 CSCL 11/6

Eighteen adhesively bonded aluminum coupons were tested on a vibration shaker at room temperature to determine the effects of varying the adhesive type/thickness, primer and adherend surface preparation on their random bending fatigue life. Most of the fatigue failures occurred within one million to one billion cycles, all at 900 microstrain. While neither the primer thickness nor the surface treatment seemed to influence the overall results, the coupons with thicker adhesive had a noticeable shorter fatigue life. Fractographic analyses of the failed adhesive

surfaces showed the locus of fracture for all coupons was predominantly within the adhesive. The nitrile phenolic adhesive demonstrated a better fatigue resistance than the nitrile epoxy. GRA

N82-17534# Bendix Corp., Kansas City, Mo.
MECHANICAL SHOCK TEST ANALYSIS Final Report
W. E. Layman Sep. 1981 13 p
(Contract DE-AC04-76DP-00613)
(DE82-000932; BDX-613-2678) Avail: NTIS HC A02/MF A01

A hammer impact form of mechanical shock testing as a substitute for the standard drop test for use on a high voltage electrical assembly was investigated. The hammer was attached so that it could fall freely through a specified angle of elevation. The hammer impact test, simulates the ringing environment a weapon system could encounter. DOE

N82-17535# Bendix Corp., Kansas City, Mo. Technical Communications.
SURVEY OF ADVANCED FRACTURE-MECHANICS TEST METHODS Final Report
G. D. Swanson Sep. 1981 20 p refs
(Contract DE-AC04-76DP-00613)
(DE82-000823; BDX-613-2639) Avail: NTIS HC A02/MF A01

The state of the art in test methods for advanced elastic-plastic fracture mechanics is determined. Four areas of potential future need were matched with ten appropriate test methods. The costs of additional equipment and fixturing, and the approximate lead time needed to implement each test capability are estimated. DOE

N82-17536# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler und Verkehr.
STRESS ANALYSIS AND TEST PHILOSOPHY FOR WIND ENERGY CONVERTER BLADES
H. Bansemir and K. Pfeifer 1980 28 p Presented at 4th Meeting of Experts on Rotor Blade Technol. with Special Respect to Fatigue Design Probl., Stockholm, 21-22 Apr. 1980
(NBB-UD-300-80-O) Avail: NTIS HC A03/MF A01

Projected wind energy converter blades for a 5MW plant are described and analyzed. The calculation of laminate cross-section properties as well the overall behavior of the blade is considered. Special attention is given to the bolted area and to the compression stresses in the blade, because it is mainly loaded by bending moments. Tests performed in order to obtain basic data of the materials used in the design are discussed. Special components such as the bolted area are tested by static and dynamic loads. Finally the strains in the entire blade under load and the eigenfrequencies are measured. A.R.H.

N82-17537# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PAST, PRESENT AND FUTURE OF SHELL STABILITY ANALYSIS
J. Arbocz May 1981 56 p refs Presented at DGLR Jahrestagung, Aachen, 12-14 May 1981
(VTH-LR-320) Avail: NTIS HC A04/MF A01

The development of the lower bound design philosophy is summarized and the theory of imperfection sensitivity is outlined. Empirical knockdown factors are applied to the results of the classical small deflection theory. The knockdown factor is chosen so that its product with the classical buckling load leads to a lower bound to all the experimental data for the shell loading configuration. By properly accounting for the effect of the initial imperfections and by taking the correct experimental boundary conditions into account, close correlation between the theoretical predictions and the experimental values is achieved. Characteristic initial imperfection distributions associated with fabrication are shown. Reliability curves obtained via the stochastic analysis of the experimentally measured initial imperfections are introduced. This concept offers a way of including the notion of imperfection sensitivity routinely into the shell design procedures. Author (ESA)

N82-17538# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
LOAD CAPACITY OF NOTCHED COMPONENTS AS DERIVED FROM POST-YIELD FRACTURE CRITERIA [TRAGLASTBESTIMMUNG GEKERBTER BAUTEILE NACH FLIESSBRUCHMECHANISCHEN KRITERIEN]
J. S. Doltsinis and H. Wuestenberg 1980 28 p refs In GERMAN
(ISD-286; ISSN-0170-6071) Avail: NTIS HC A03/MF A01

Post-yield fracture mechanics were reviewed and elastoplastic behavior was studied, using finite element analysis. The elastic limit was derived and the analytic load capacity was established. The fracture mechanical assessment involves post-yield fracture criteria, a critical crack opening displacement computation, and a validity check of the failure assessment diagram. The numerical results are evaluated and shown to compare reasonably well with experimental data. Author (ESA)

N82-17539# Oxford Univ. (England). Engineering Lab.
A DERIVATION OF THE SMALL-STRAIN INCREMENTAL THEORY OF PLASTICITY FROM THERMOMECHANICS
G. T. Houlsby 1981 27 p refs
(OUEL-1371/81; SM020/GTH/81) Avail: NTIS HC A03/MF A01

It is postulated that a material can be entirely described by two functions of kinematic variables: the specific free energy and the specific dissipation functions. For certain choices of these functions, the two phenomena of a yield surface and a flow rule are automatically derived and an elastic-plastic material is described. The flow rule and yield surface are not, however, introduced as special hypotheses. The theory has certain advantages over the conventional approach: (1) plasticity models, involving nonassociated flow, can be accommodated without the violation of any thermodynamic principles; (2) elastic-plastic coupling is treated simply and without any ambiguity in the definition of plastic strain; (3) a criterion for plastic loading arises logically; and (4) unity between elasticity, plasticity and viscosity theories is achieved. These points are illustrated by simple examples. Author (ESA)

N82-17540# Oxford Univ. (England). Engineering Lab.
A CORRECTION TO THE ENGINEERING THEORY OF ELASTIC STABILITY
J. D. Renton 1981 15 p refs
(OUEL-1376/81) Avail: NTIS HC A02/MF A01

Bolotin continuum equations for the stability of isotropic, linearly elastic media are discussed. Implicit in the derivation of these equations are the usual engineering assumptions that the embedded coordinate system is not significantly different in the loaded state from that in the unloaded state and that the equations of linear isotropic elasticity relate small increments of stress to small increments of strain from the loaded state. An analysis where the first assumption is retained, strains in the elastic region being limited to very small values for structural metals, is presented. However, the relationship between the increments of stress and strain are now derived from an elastic potential expressed as a function of the Lagrangian strain. Results show that this gives rise to additional terms of the same order of magnitude as those already included in Bolotin's equations. Author (ESA)

N82-17541# Oxford Univ. (England). Engineering Lab.
STRESS INTENSITY FOR INTERACTING FLAWS. PART 2: A LITERATURE SURVEY OF FRACTURE CRITERIA
C. Ruiz and Y. P. Phang 1981 76 p refs 2 Vol.
(OUEL-1367/81-Pt-2) Avail: NTIS HC A05/MF A01

Theories of fracturing, beginning with the 15th century to present, are reviewed. Classical fracture analysis, leading up to the ductile-brittle transition temperature approach, is surveyed. Energy release rate criteria, linear elastic fracture mechanics, and elastic plastic fracture mechanics are considered. General yielding fracture mechanics and modern failure analysis are presented. Author (ESA)

N82-17542# Oxford Univ. (England). Engineering Lab.
STRESS INTENSITY FOR INTERACTING FLAWS. PART 3: PHOTOELASTIC DETERMINATION OF MIXED

MODES; STRESS INTENSITY FACTORS FOR INTERACTING FLAWS
C. Ruiz and Y. P. Phang 1981 38 p refs 2 Vol.
(OUEL-1368/81-Pt-3) Avail: NTIS HC A03/MF A01

The photoelastic method was used to characterize the severity of interaction of cracks by evaluation of the stress intensity factors at the interacting crack tips. Existing methods for retrieving stress intensity factors from the isochromatic fringe pattern are reviewed. Since all the methods can be related to the general case of a crack subjected to both opening and sliding modes of loading, a relation between the isochromatic fringe order and the stress intensity factor was derived. None of the existing methods determines mixed mode stress intensity factors in three-dimensional bodies. A method for direct determination of K sub 1, K sub 2, and K sub 3 in a three-dimensional body is suggested. As photoelastic determination of stress intensity factors is based on modified Westergaard equations, their validity for interpreting isochromatic fringe patterns is examined. Results show that these equations are not sufficient for complete interpretation of the fringe pattern of interacting cracks; incorporation of a series stress function is necessary.
Author (ESA)

N82-17543# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.
WEIGHTING OF DISTANCES IN FACTORIAL ANALYSIS [PONDERATION DES DISTANCES EN ANALYSE FACTORIELLE]
Yves LeFoll Oct. 1981 24 p refs In FRENCH Presented at Congr. de l'Assoc. des Statisticiens Univ. (A.S.U.), Jun. 1981
(ENST-C-81005) Avail: NTIS HC A02/MF A01

Similarities between factorial analysis methods and principal component analysis are pointed out. The latter is characterized by weights and distances of the points in a representation. When the weights are associated to the distances the factorial components can have quasi-ordinal, local or statistical properties. The type of extremum problems, the solution of which makes this possible, is defined. A basic problem in interpretation of the axes and principal subspaces of inertia of a Euclidean representation is solved, then discussed as a problem in proximity analysis.
Author (ESA)

N82-17544# European Space Agency, Paris (France).
INELASTIC BUCKLING OF COLUMNS OF L AND U CROSS SECTION
Rolf Zick Dec. 1981 35 p refs Transl. into ENGLISH of "Beulen von L- u. U-profilen im plastischen Bereich" Rept. DFVLR-FB-80-31 Brunswick, 1980 Original report in GERMAN previously announced as N81-22435
(ESA-TT-709; DFVLR-FB-80-31) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 12

The buckling stresses of axially compressed columns, having either U or L cross section, are determined using the Prandtl-Reuss law and the method of transfer matrices. The deflections of the cross sectional elements are described by the plate equation and the linearized differential equation for planar deformations. The results are discussed in terms of stress-strain laws and are satisfactorily compared with test measurements. Agreement is also shown with a standard method of calculation which is briefly described.
Author (ESA)

42 GEOSCIENCES (GENERAL)

N82-17545 Northwestern Univ., Evanston, Ill.
GLOBAL TECTONIC CONTROL OF SECULAR VARIATIONS IN PHANEROZOIC SEDIMENTARY ROCK/OCEAN/ATMOSPHERE CHEMISTRY Ph.D. Thesis
John Dowling Pigott 1981 211 p
Avail: Univ. Microfilms Order No. 8124979

Global changes in sea level owing to geotectonic mechanisms during the Phanerozoic have dynamically affected the partitioning of carbon and sulfur among the exogenic reservoirs. As a result, the chemistry of the Earth's surface environment has been time variant. Analyses of mineralogically homogeneous brachiopod shell material and associated micrite organics support the secular variability of whole rock isotopic data compiled from the literature. Together, the data indicate the ratio of reduced carbon to total carbon sediments is low at times of global high sea level and high at times of global low sea level. Conversely, reduced and oxidized sulfur as calculated from the del 34S values of evaporites follow opposite trends: the ratio of reduced sulfur species to total sulfur species is high at times of high sea level and low at times of low sea level. The operation of a global tectonic model of carbon and sulfur cycling described by a set of mass transfer reactions consistent with these observations is proposed.
Dissert. Abstr.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-17546 Illinois Univ. at Urbana-Champaign.
HYDROLOGY AND HYDROGEOCHEMISTRY OF THE SOUTH FORK, WRIGHT VALLEY, SOUTHERN VICTORIA LAND, ANTARCTICA Ph.D. Thesis
Henry John Hayden Harris 1981 359 p
Avail: Univ. Microfilms Order No. 8127604

Don Juan Pond is a large, unique brine pond situated in a closed basin at the topographically lowest point of the south fork. The floor of the basin is a discharge zone for groundwater brines confined in an underlying dolerite aquifer. Rapid, transient fluctuations of fluid pressure in the aquifer were recorded at a borehole drilled in the basin. The fluctuations are explained for the behavior of fluids in stressed porous media; they are interpreted as evidence of movements in a rock glacier lying near the pond. The characteristics of the fluctuations suggest that the causative movements were small and abrupt and involved a large part of the rock glacier. The major element chemistry of the brines is controlled by phase relations in the aqueous system CaCl2-NaCl, for which the important solid phases are antarcticite, halite, hydrohalite, and ice. Evaporation which forces the precipitation of halite and antarcticite and dilution control the chemistry of the pond during the austral summer; temperatures as low as -50 C control its chemistry during winter.
Dissert. Abstr.

N82-17547 Florida Univ., Gainesville.
THE SIGNIFICANCE OF TROPICAL CYCLONE RAINFALL IN THE WATER SUPPLY OF SOUTH FLORIDA Ph.D. Thesis
Donald Brandes 1981 163 p
Avail: Univ. Microfilms Order No. 8127418

If hurricanes fail to influence the rainfall of South Florida, either because of human intervention by weather modification or because of possible natural climatic change, the water budget is affected. The study of tropical cyclone rainfall for a sixty-year period from 1919 through 1978 reveals that the amount of rain from hurricanes declined significantly in the last several decades. This decline is discussed in relation to its effects on water supply and management in the South Florida Water Management District. Although declining supplies and increasing consumption portend severe chronic water shortages in the region, the knowledge that hurricanes do not bring as much rain as water management officials had thought should allow more effective use of surface storage reservoirs.
Dissert. Abstr.

N82-17548 Michigan State Univ., East Lansing.
RATES AND IMPLICATIONS OF BLUFF RECESSION ALONG THE LAKE MICHIGAN SHOREZONE OF MICHIGAN AND WISCONSIN Ph.D. Thesis
William Roger Buckler 1981 221 p
Avail: Univ. Microfilms Order No. 8126477

Long-term Lake Michigan bluff crest recession rates at 118 widespread locations in Michigan and Wisconsin were determined by contrasting recent field measurements with those from 19th century government land office surveys. These rates are evaluated spatially and related to selected shorezone

characteristics. Lake level records and serial photographic data were compared to determine recent recession rates at closely spaced case study sites in Shoreham, Michigan, and Kenosha County, Wisconsin; these provide a basis for predicting future bluff crest positions. Results of the two case studies disclose that: (1) modern recession rates vary according to the interval between measurements; (2) the highest rates tend to occur within periods that contain the greatest percentage of years when lake levels are high; and (3) modern rates are not similar to longer-term retreat values, a condition largerly attributable to increasing numbers of shore protection structures that may accelerate bluff retreat in some places. Dissert. Abstr.

N82-17549 Colorado State Univ., Fort Collins.
A METHOD OF EVALUATING LANDFORM CLASSIFICATION SYSTEMS FOR RENEWABLE RESOURCE ASSESSMENT AND PLANNING Ph.D. Thesis
Lawrence Gene Kolenbrander 1981 223 p
Avail: Univ. Microfilms Order No. 8126437

A methodology for evaluating different landform classification systems was developed based on the landform attributes, structural arrangement, and operational characteristics of a landform classification system ideally suited for natural resource assessment and planning. Eighteen morphometric, surficial materials, genetic, and combined approaches to landform classification were reviewed and evaluated in a two-stage process. All eighteen systems were examined and rated according to a conceptual testing procedure. From the eighteen systems, four systems were selected for empirical field application and testing. None of the existing landform classification systems which was examined meets the needs of natural resource assessment and planning as defined by the objectives and evaluation criteria. There is no readily identifiable method of integrating two or more of the four systems into one acceptable landform classification system.
Dissert. Abstr.

N82-17550 Michigan Univ., Ann Arbor.
SIMULATION OF ICE-COVER GROWTH AND THERMAL DECAY ON THE UPPER ST. LAWRENCE RIVER Ph.D. Thesis
Gordon Mather Greene 1981 156 p
Avail: Univ. Microfilms Order No. 8125117

Four computer models are described. The first two models are based on analytic solutions to equations describing the transfer of heat within an ice cover with uniform properties. A third model is described which combines a surface energy balance solution for a surface temperature with a finite difference implicit heat diffusion scheme that permits non-linear temperature gradients in the ice. The fourth model incorporates elements from the first three models. A surface temperature is derived from computations of the surface energy fluxes. This temperature then becomes an upper boundary condition for an analytic model that includes turbulent heat transfer beneath the ice cover. This model best approximates the observed rates of growth and decay if one assumes a frazil ice layer beneath the ice cover so that the water temperature close to the lower boundary can be set close to 0 C.
Dissert. Abstr.

N82-17551*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PSYCHO-SOCIAL ASPECTS OF PRODUCTIVITY IN UNDERGROUND COAL MINING
Gib Akin 1 Oct. 1981 91 p refs
(Contract NAS7-100; DE-AI01-76ET-12548)
(NASA-CR-168429; JPL-Pub-81-113; DOE/ET-12548/10) Avail: NTIS HC A05/MF A01 CSCL 08I

The psychosocial aspects of productivity in underground coal mining were investigated. The following topics were studied: (1) labor productivity in deep mines and the explanations for productivity changes; (2) current concepts and research on psychosocial factors in productivity; (3) a survey of experiments in productivity improvement; (4) the impact of the introduction of new technology on the social system and the way that it accomplishes production; (5) a clinical study of a coal mining operation, model described how production is actually accomplished by workers at the coal face; (6) implications and recommendations for new technology design, implementation and ongoing management. E.A.K.

N82-17552# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
HELIUM PRODUCTION IN NATURAL GAS RESERVOIRS
E. B. Pereira and J. A. S. Adams (Rice Univ., Houston, Tex.) Aug. 1981 14 p refs Submitted for publication
(INPE-2214-PRE/014) Avail: NTIS HC A02/MF A01

About 11,000 published natural gas analyses of helium were used in the estimation of the average global scale accumulation and concentration of radiogenic helium in sediments. Simple lognormal statistics are employed to derive a net accumulation rate between 1000,000 to 670,000 helium atoms per cubic meter of reservoir rock per second. This accumulation rate permits an inference of an average helium concentration of non-reservoir sediments of about 67 ppm. By assuming a simple closed system model, it is shown that deep seated sources of helium are not necessary to explain the present regime of helium in sediments on a global scale, and that the accumulation rate and concentration obtained are in close agreement with existing fundamental geochemical estimates of uranium and thorium in rather average type of sediments. R.J.F.

N82-17553*# Wyle Labs., Inc., Huntsville, Ala. Scientific Services and Systems Group.
BASELINE STUDIES ON THE FEASIBILITY OF DETECTING A COAL/SHALE INTERFACE WITH A SELF-POWERED SENSITIZED PICK Final Report
Granville R. Anderson, II 19 Feb. 1981 98 p refs
(Contract DEN8-000011)
(NASA-CR-161960) Avail: NTIS HC A05/MF A01 CSCL 08I

The feasibility of utilizing a sensitized pick to discriminate between cutting coal and roof material during the longwall mining process was investigated. A conventional longwall mining pick was instrumented and cutting force magnitudes were determined for a variety of materials, including Illinois #6 coal, shale type materials, and synthetic coal/shale materials. E.A.K.

N82-17554*# Mississippi State Univ., Mississippi State. Engineering and Industrial Research Station.
THE DESIGN OF A MECHANICAL REFERENCING SYSTEM FOR THE REAR DRUM OF THE LONGWALL SHEARER COAL MINER Final Report
E. William Jones and Thomas Chen-Hsing Yang 4 Jun. 1981 78 p refs
(Contract NCA8-00131)
(NASA-CR-161962; MSSU-EIRS-ME-81-4) Avail: NTIS HC A05/MF A01 CSCL 08I

The design of two systems which reference the position of a longwall shearer coal miner to the mine roof of the present cut and of the last cut are presented. This system is part of an automation system that will guide the rear cutting drum in such a manner that the total depth of cut remains constant even though the front drum may be following an undulating roof profile. The rear drum referencing mechanism continually monitors the distance from the mine roof to the floor for the present cut. This system provides a signal to control a constant depth of cut. The last cut follower mechanism continually monitors the distance from the mine roof of the prior cut to the cutting drum. This latter system provides a signal to minimize the step height in the roof between cuts. The dynamic response of this hydraulic-pneumatic and mechanical system is analyzed to determine accumulator size and precharge pressure. B.W.

N82-17555*# Missouri Univ., Rolla. Rock Mechanics and Explosives Research Center.
THE DETECTION OF THE COAL ROOF INTERFACE BY USE OF HIGH PRESSURE WATER Final Report
1981 55 p refs
(Grant NsG-8055)
(NASA-CR-161959) Avail: NTIS HC A04/MF A01 CSCL 08I

A device whereby water jets can be used to detect the interface between coal and the overlying roof rock is described. Once this identification is made this distance can be measured using instruments such as the autofocus systems recently developed in the photographic industry. Experiments carried out show that the dzvice can discriminate between coal and rock at coal thicknesses up to 8 inches. An autofocus system was

examined which indicates accuracies of better than 0.1 inches. B.W.

N82-17556# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
BANGUI ANOMALY Progress Report
R. Godivier 24 Nov. 1981 13 p
(WORK-M-45) Avail: NTIS HC A02/MF A01

Gravity maps of central Africa are discussed. A seismic study of the region's crust and upper mantle is reported. A seismic study of the Bangui anomaly is reviewed. For individual titles, see N82-17557 through N82-17559.

N82-17557# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
GRAVITY MAPS OF CENTRAL AFRICA
R. Godivier and Y. Albouy *In its* Bangui Anomaly 24 Nov. 1981 2 p (For primary document see N82-17556 08-43)
Avail: NTIS HC A02/MF A01

Publication of gravity maps of Central Africa is announced. More than 3,000 pieces of data were used. To include the northern part of the Central African Republic and the southern part of the Chad Republic, a previously collected batch of data was added. The theoretical value of the gravity was calculated in the Potsdam's system in order to make the maps homogeneous with other maps. The terrain corrections were not calculated due to lack of accurate topographic maps. The elevation of most of the stations was determined from barometric measurement. N.W.

N82-17558# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
SEISMIC STUDY OF THE CRUST AND UPPER MANTLE OF THE R.C.A.
P. Mourgues *In its* Bangui Anomaly 24 Nov. 1981 5 p (For primary document see N82-17556 08-43)
Avail: NTIS HC A02/MF A01

Willmore seismometers of 2.3 second natural period with a damping of 0.8 were utilized. The records were obtained by a FM multiplex recording system on magnetic tape by triggering. The apparent azimuth (AZ sub o) was obtained by triangular solution for the best records of earthquakes occurring at distances greater than 30 deg. The azimuth anomaly (Delta AZ) was obtained by difference with geographical azimuth of epicenters (AZ sub T) as: Delta AZ = AZ sub o - AZ sub T. The general shape of Delta AZ distribution, as a function of AZ sub T, indicates a dominantly westward dip of deep structure which seems to evident from 60 deg to 300 deg of azimuth. However, the null deflection observed around 0 deg azimuth shows that structure is more complex and cannot be interpreted as a single dipping structure. N.W.

N82-17559# Office de la Recherche Scientifique et Technique Outre-Mer, Paris (France).
SEISMIC STUDY OF THE BANGUI ANOMALY
L. Dorbath and C. Dorbath *In its* Bangui Anomaly 24 Nov. 1981 5 p (For primary document see N82-17556 08-43)
Avail: NTIS HC A02/MF A01

The seismic recording of the anomaly was made along the line which cuts the maximum magnetic anomaly seen from the satellite. Eight stations equipped with transducers and recorders were set up every 20 kilometers. The deflection of the internal clocks was checked by the daily recording of the WWV radio signals. All the gains were adjusted at 84 db. Since the operation aims mainly at recording teleseisms, the signal from the transducer was filtered through a low-pass filter with a cut off frequency of 5Hz. The locations of the stations were determined through maps to the 1/200.00 and 1/2.000 scales. The recording is made on smoked paper with a traverse speed amounting to 120 mm/mn; the thickness of the line is lower than 0.1 mm; the reading through a micrometric lamp graduated in 0.1 mm allows to evaluate the 0.05 mm with a precision of 0.25 s. N.W.

N82-17560*# Shaker Research Corp., Ballston Lake, N. Y.
DEVELOPMENT OF SENSITIZED PICK COAL INTERFACE DETECTOR SYSTEM Final Report
R. F. Burchill [1982] 68 p
(Contract NAS8-32538)
(NASA-CR-161961) Avail: NTIS HC A04/MF A01 CSCL 08I

One approach for detection of the coal interface is measurement of pick cutting loads and shock through the use of pick strain gage load cells and accelerometers. The cutting drum of a long wall mining machine contains a number of cutting picks. In order to measure pick loads and shocks, one pick was instrumented and telemetry used to transmit the signals from the drum to an instrument-type tape recorder. A data system using FM telemetry was designed to transfer cutting bit load and shock information from the drum of a longwall shearer coal mining machine to a chassis mounted data recorder. The design of components in the test data system were finalized, the required instruments were assembled, the instrument system was evaluated in an above-ground simulation test, and an underground test series to obtain tape recorded sensor data was conducted. T.M.

N82-17561*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN OPTICAL MODEL FOR THE MICROWAVE PROPERTIES OF SEA ICE
P. Gloersen and J. K. Larabee Nov. 1981 28 p refs Submitted for publication
(NASA-TM-83865) Avail: NTIS HC A03/MF A01 CSCL 08L

The complex refractive index of sea ice is modeled and used to predict the microwave signatures of various sea ice types. Results are shown to correspond well with the observed values of the complex index inferred from dielectic constant and dielectric loss measurements performed in the field, and with observed microwave signatures of sea ice. The success of this modeling procedure vis a vis modeling of the dielectric properties of sea ice constituents used earlier by several others is explained. Multiple layer radiative transfer calculations are used to predict the microwave properties of first-year sea ice with and without snow, and multiyear sea ice. Author

N82-17562*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CHARACTERIZING USER REQUIREMENTS FOR FUTURE LAND OBSERVING SATELLITES
J. L. Barker, P. J. Cressy, C. C. Schnetzler, and V. V. Salomonson Dec. 1981 56 p refs
(NASA-TM-83867) Avail: NTIS HC A04/MF A01 CSCL 05B

The objective procedure was developed for identifying probable sensor and mission characteristics for an operational satellite land observing system. Requirements were systematically compiled, quantified and scored by type of use, from surveys of federal, state, local and private communities. Incremental percent increases in expected value of data were estimated for critical system improvements. Comparisons with costs permitted selection of a probable sensor system, from a set of 11 options, with the following characteristics: 30 meter spatial resolution in 5 bands and 15 meters in 1 band, spectral bands nominally at Thematic Mapper (TM) bands 1 through 6 positions, and 2 day data turn around for receipt of imagery. Improvements are suggested for both the form of questions and the procedures for analysis of future surveys in order to provide a more quantitatively precise definition of sensor and mission requirements. A.R.H.

N82-17563*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE-DERIVED ICE DATA SETS NO. 1: ANTARCTIC MONTHLY AVERAGE MICROWAVE BRIGHTNESS TEMPERATURES AND SEA-ICE CONCENTRATIONS, 1973 - 1976
H. J. Zwally Nov. 1981 35 p refs Submitted for publication
(NASA-TM-83812) Avail: NTIS HC A03/MF A01 CSCL 08L

A summary data set concerning 4 years of Antarctic sea-ice conditions was created and is available on magnetic tape. The data were derived from electrically scanning microwave radiometer brightness temperatures and were mapped into a polar stereographic grid enclosing the 50 deg S latitude circle. The grid size varies from about 32 by 32 sq km at the poles to about 28 by 28 sq km at 50 deg S. The microwave brightness temperatures of Antarctic sea ice are predominantly characteristic

of first-year ice with an emissivity of 0.92 at 19 GHz frequency. Sea ice concentrations were calculated from the brightness temperature data for each grid element with an algorithm that uses an emissivity value of 0.92 and an ice physical temperature estimate from climatological surface air temperatures. Monthly, multiyear monthly, and yearly maps of brightness temperatures and sea ice concentrations were created for the 4 years, except for 7 months for which useable data were insufficient. Author

N82-17564# Sheffield Univ. (England). Dept. of Control Engineering.
THE MODELLING OF SEMIFLEXIBLE CONVEYOR STRUCTURES FOR COAL-FACE STEERING INVESTIGATIONS. PART 1: SPATIALLY DISCRETE MODELS
J. B. Edwards, R. A. Wolfenden (National Coal Board), and A. M. S. R. Yazdi Apr. 1981 35 p refs Submitted for publication 2 Vol.
(RR-151-Pt-1) Avail: NTIS HC A03/MF A01

The coal-cutting machine shown is of the ranging-drum shearer type. The machine both cuts the coal from the solid face as it proceeds along the face and simultaneously loads the product onto the scraper-chain conveyor. This operation is aided by the spiral vanes around the rotating drum periphery upon which the cutting picks are mounted. The scraper-chain conveyor also has more than a single function: it not only conveys the cut product to the face-end but, because of the robust construction if its structure, it also provides a comparatively smooth track upon which the power-loader rides. Mathematical models of the steering system and the overall process are presented. Examples of predicted behavior are given. J.M.S.

N82-17565# Sheffield Univ. (England). Dept. of Control Engineering.
THE MODELLING OF SEMIFLEXIBLE CONVEYOR STRUCTURES FOR COAL-FACE STEERING INVESTIGATIONS. PART 2: SPATIALLY CONTINUOUS MODELS
J. B. Edwards Apr. 1981 25 p refs Submitted for publication 2 Vol.
(RR-152-Vol-2) Avail: NTIS HC A02/MF A01

A linear model of a flexible conveyor used on longwall coal-faces and designed to permit vertical floor undulations to be followed is presented along with a continuous elastic beam model. Predictions of the multipass system stability using the beam model are discussed. J.M.S.

N82-17566# Research Inst. of National Defence, Stockholm (Sweden).
REMOTE SENSING TECHNIQUES SUITABLE FOR EXPLORATION AND NAVIGATION IN AND UNDER SEA ICE
Ragnar Thoren 1981 44 p refs Presented at Intern. Colloq. of the Intern. Soc. of Photogrammetry and Remote Sensing on Spectral Signatures of Objects in Remote Sensing, Avignon, France, 8-11 Sep., 1981
(FOA-Rept-Vol-15-No-2; FOA-B-60002-M7; ISBN-91-7056-057-9) Avail: NTIS HC A03/MF A01; Research Inst. of National Defence, Stockholm Kr 9

The performance of advanced satellite navigation used aboard Swedish and Soviet icebreakers is reported. It is shown that the ships' position was obtained with very high precision in spite of frequent fog. Further development of remote sensing satellite systems for ocean monitoring, the development of LORAN C into an expanded and improved aid to navigation, and the importance of visual ice reconnaissance in combination with optical viewing systems in arctic waters are also addressed. Developments in underwater technology, including hydroacoustics, hydrooptics, laser depth sounding, underwater communication, and subsea exploratory drilling are included. J.M.S.

N82-17567# Office of Naval Research, Pasadena, Calif.
ARABIAN SEA PROJECT OF 1980: COMPOSITES OF INFRARED IMAGES
Ben J Cagle and Robert Whritner Aug. 1981 67 p
(AD- .7910; ORNWEST-81-5) Avail: NTIS HC .04/MF A01 CSCL 08/1

A technique was developed for determining the mesoscale features of the Arabian Sea, and reported on in ONRWEST Report 81-3. A method for assembling composites of images in mosaic form is presented. Enhanced images are presented with surface interpretations for the spring and fall transition periods related to the Northeast and Southwest Monsoons, respectively. Author (GRA)

N82-17568# Defense Mapping Agency, Washington, D.C.
THE PAIGH GAZETTEER PROGRAM Interim Report
Richard R. Randall 27 Oct. 1981 9 p Prepared for Pan American Institute of Geography and History
(AD-A107549) Avail: NTIS HC A02/MF A01 CSCL 08/6

In March of 1980, PAIGH authorities approved a new program calling for the production of a series of national gazetteers. The gazetteers are to be based principally on names appearing on the PAIGH map series at 1:250,000, but will also include other names in accordance with national requirements. A meeting of a Gazetteer Working Group comprised of representatives of interested countries took place in Panama during July 1981. At that meeting, discussions centered on the development of common specifications for the gazetteers. Decisions were made regarding gazetteer format and the establishment of work and production schedules by participating nations. This paper describes the gazetteer program in detail and reports on the current status of work. Author (GRA)

N82-17569# Montana State Univ., Missoula.
AN INVESTIGATION OF THE HIGH RATE VOLUMETRIC PROPERTIES OF SNOW Final Report, 1 May 1978 - 31 Oct. 1981
R. L. Brown Nov. 1981 158 p refs
(Contract DAAG29-78-G-0089)
(AD-A108032; ARO-15413.9-GS) Avail: NTIS HC A08/MF A01 CSCL 08/12

Reported here are the results of a three year study of the high rate volumetric properties of snow. In addition to the report presented here, the project resulted with over ten publications which are included in the list of references. The constitutive behavior of dry snow is analyzed and described mathematically by means of two microdynamical models. These are then evaluated by means of previous experimental data. A number of applications are then investigated. These applications include vehicle mobility in shallow and deep snowpack, steady shockwaves, and nonsteady shockwaves. Finally, an electromagnetic stress wave generator was designed, constructed and used in a shockwave testing program on snow. Experimental results are presented and discussed. Author (GRA)

N82-17570# Inter-American Geodetic Survey, Fort Sam Houston, Tex.
PHOTOGRAMMETRY SOFTWARE. A PACKAGE FOR EVERYONE
James R. Hawk Oct. 1981 59 p
(AD-A108098) Avail: NTIS HC A04/MF A01 CSCL 08/2

An example photogrammetry software is presented for consideration. The system is being implemented throughout Latin America by IAGS. It includes both analytical and semi-analytical adjustments. It is a simplistic yet versatile system which has proven very successful. Author (GRA)

N82-17571# Inter-American Geodetic Survey, Fort Sam Houston, Tex.
CIMS: THE CARTOGRAPHIC INFORMATION MANAGEMENT SYSTEM
Jeff R. Ingram and Robert A. Simms 1981 19 p refs
(AD-A108108) Avail: NTIS HC A02/MF A01 CSCL 08/2

The system described in this paper is a small microcomputer system being developed for the cataloging of graphical and nongraphical cartographic data describing the sources available and/or used in constructing maps and charts. The system is envisioned as a useful method to cartographic managers for reviewing sources belonging to an agency and determining what sources to use in a new or revised map product. Author (GRA)

N82-17572# Donohue, Anstey, and Morrill, Boston, Mass.
A PROJECT TO TEST FOR SHALE GAS IN OHIO Final Report
30 Apr. 1981 197 p
(Contract DE-AC21-78MC-08339)
(DE82-000916; DOE/MC-12697/T3) Avail: NTIS HC A08/MF A01

Methods to find deep zones of natural fracture in the search for viable shale gas are discussed. The measurement of seismic velocity in the shale is examined. This speed is expected to be lowered by the presence of fractures, particularly if the fractures contain gas. The seismic reflection method, which times the echoes from deep rock layers, is used to measure the speed of sound in the shale. The results of the seismic velocity analysis are summarized. Gas was obtained from two naturally fractured zones in the Chagrin shale. The well was stimulated and tested at three separate levels: the Rhinestreet shale, Huron shale, and the Chagrin. DOE

N82-17573# Donohue, Anstey, and Morrill, Boston, Mass.
SHALE GAS IN THE SOUTHERN CENTRAL AREA OF NEW YORK STATE: PART 1. HOW TO FIND AND DEVELOP SHALE GAS IN NEW YORK STATE
Apr. 1981 71 p Sponsored in part by New York Energy Research and Development Authority
(Contract DE-AC21-79MC-12697)
(DE82-000913; DOE/MC-12697/T1) Avail: NTIS HC A04/MF A01

The economics of shale-gas exploration in New York are discussed. To date three wells have been artificially fractured in the Marcellus shale of New York, and all three appear to be producers. The chances of extracting gas are improved if geological techniques can identify zones of a suitable degree of natural fracturing in the shale. These techniques are aided by detailed structure maps of the shale units. It is concluded that the most likely source of shale gas in south central New York is the Marcellus formation. The following recommendations are made: shale gas wells should be drilled with air; the dry open hole should be logged with gamma-ray, density, temperature and noise logs; the shale should be artificially fractured using a nitrogen stimulation technique. DOE

N82-17574# Commercialization Insights, Tampa, Fla.
EVALUATION OF ALTERNATIVES IN DOWNHOLE STEAM GENERATION
Sep. 1981 82 p Sponsored by DOE
(DE82-001943; DOE/TIC-2001943) Avail: NTIS HC A05/MF A01

The development of downhole steam generators for requirements of commercialization, technical, and economic goals were evaluated. It is found that: (1) the high pressure downhole steam generator has potential for commercialization in the production of heavy oil; (2) oil yield is the critical performance parameter; (3) the downhole hydrogen/oxygen has potential for production of resources which are not unproducible or uneconomical; (4) the critical performance provided in nearly 1100 pre and posttraining forms returned by the solar and 201 stream sediment samples. Statistical and areal distributions of uranium and possible uranium related variables are displayed. Pertinent geologic factors in evaluating the potential for uranium mineralization are discussed. The high uranium values occur primarily in pleistocene delta deposits and in glacial outwash and till. Groundwater in this area is geographically associated with high values of calcium, magnesium, manganese, potassium, selenium, strontium, sulfate, and total alkalinity. DOE

N82-17575# New Mexico Inst. of Mining and Technology, Socorro. Petroleum Recovery Research Center.
DEVELOPMENT OF MOBILITY CONTROL METHODS TO IMPROVE OIL RECOVERY BY CO2 Quarterly Report, 1 Jul. - 30 Sep. 1981
J. P. Heller 1981 6 p refs
(Contract DE-AC21-79MC-10689)
(DE82-001968; DOE/MC-10689/10; PRRC-81-41; QR-8) Avail: NTIS HC A02/MF A01

The development of foam-type mobility control agents, core flooding system, and direct thickeners consisting of polymers soluble in CO2 are discussed. The core flooding test system is operational with all components essentially complete. Foam generation was principally concerned with experiments designed to ascertain the proper operating regions for the generator. The second mobility agent is being developed for the direct thickness of CO2. A number of polymeric compounds were found which are soluble in CO2. DOE

N82-17576# Gruy Federal, Inc., Houston, Tex.
TARGET RESERVOIRS FOR CO2 MISCIBLE FLOODING, TASK TWO. SUMMARY OF AVAILABLE RESERVOIR AND GEOLOGICAL DATA. VOLUME 1: PERMIAN BASIN GEOLOGICAL AND RESERVOIR DATA. PART 2: ADAIR-SAN ANDRES THROUGH EUNICE Final Report
L. B. Cobb Oct. 1981 336 p refs
(Contract DE-AC21-79MC-08341)
(DE82-001348; DOE/MC-08341/31-Vol-1-Pt-2) Avail: NTIS HC A15/MF A01

The types of injected fluid, type of injector, fluid status, efficiency of type injector, injection pattern, and operational problems are coded and tabulated for oil and gas reservoirs in New Mexico and Texas. Water analysis records are included. DOE

N82-17577# FMC Corp., Santa Clara, Calif. Engineered Sytems Div.
HIGH ANGLE MINING SYSTEM TASK REPORT: SYSTEM REQUIREMENTS, PERFORMANCE SPECIFICATIONS, AND REVIEW OF STATE-OF-THE-ART TECHNOLOGY
E. G. Brown Jan. 1981 36 p
(Contract DE-AC01-80FT-14257)
(DE82-001078; DOE/ET-14257/2) Avail: NTIS HC A03/MF A01

Existing mining systems operable from the surface with at least a limited down seam capability were compared. A normal down dip limitation of 15 degrees is shown for augers. At this angle conveying performance of the auger screw decreases slightly. At about 25 degrees, borehole packing begins to occur and conveying efficiency is substantially reduced. Higher rotational speeds and a shorter screw pitch improves conveying performance. Ten foot diameter holes were accomplished. Seven feet is the largest practical size. The deepest known penetration depth for a seven foot diameter is 150 feet. The largest practical size for a twin head auger would produce a 3 foot high by 6 foot wide oval hole about 150 feet deep. The largest practical diameter for a 200 foot penetration depth is believed to be about 42 inches. The efficiency factors are derived from the horizontal tonnage capacity and the gross horsepower for each machine. All of the continuous miners discussed are capable of operating down dip to the normal pitch limit without assistance modification. DOE

N82-17578# World Meteorological Organization, Geneva (Switzerland).
SEA-ICE FORMATION SERVICES IN THE WORLD
1981 114 p refs
(WMO-574; ISBN-92-63-10574-X) Avail: NTIS MF A01; print copy available at WMO, Geneva

The state of the art in the acquisition, exchange, processing, storage, and dissemination of sea ice information is described. The nature of sea ice, methods of observation, and the basis of ice information services are considered. The sea ice information services available from 17 countries are listed. For each, details as to organization, data acquisition, output products, forecasts, publications, and mailing address are given. Author (ESA)

N82-17579# New England River Basins Commission, Boston, Mass.
BEFORE THE WELL RUNS DRY: A HANDBOOK ON DROUGHT MANAGEMENT
Aug. 1981 63 p refs Sponsored in part by Geological Survey, Reston, Va.
(PB82-105818) Avail: NTIS HC A04/MF A01 CSCL 13B

A handbook is presented with a five-step planning process for local water supply officials to follow for designing a drought contingency plan. It explains and illustrates through a specific case study how and when a community can choose from among measures designed to augment supply and reduce demand to alleviate the problems of a drought. The key ingredients for a successful drought management plan are advance planning community cooperation. GRA

N82-17580# New England River Basins Commission, Boston, Mass.
BEFORE THE WELL RUNS DRY: A HANDBOOK FOR DESIGNING A LOCAL WATER CONSERVATION PLAN

Oct. 1980 96 p
(PB82-105826) Avail: NTIS HC A05/MF A01 CSCL 13B

A concise, clean cut, seven step planning procedure for local water supply officials to follow in designing a water conservation plan is presented. The procedure is flexible, can be used by any type of water utility, can be used anywhere in the country, and can meet a variety of goals. It is designed to help local officials consider the full range of options available to them and the potential impact of each option on the utility, the users, and the community. GRA

N82-17581# Nevada Univ. System, Reno. Water Resources Center.
WATER FOR NON-NUCLEAR ENERGY DEVELOPMENT IN THE GREAT BASIN
Sep. 1981 344 p refs Sponsored in part by Water Resources Council, Washington, D.C.
(PB82-116781) Avail: NTIS HC A15/MF A01 CSCL 13B

The availability of water to support conventional and emerging non-nuclear energy technologies under certain hypothetical world oil prices was assessed and major effects that these levels of energy development could have on the regions water resources were identified in an effort to aid national and regional energy supply planning and decision making. GRA

N82-17582# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Environmental Research Lab.
SIMULATION OF ICE-COVER GROWTH AND DECAY IN ONE DIMENSION ON THE UPPER ST. LAWRENCE RIVER
Gordon M. Greene Jun. 1981 90 p refs
(PB82-114208; NOAA-TM-ERL-GLERL-36; NOAA-81081904) Avail: NTIS HC A05/MF A01 CSCL 08L

A series of models simulating the growth and decay of channel ice in one dimension on the upper St. Lawrence River are presented. Ice growth and decay for the reach of the river between the Moses-Saunders Power Dam at Cornwall, Ont., and Lake Ontario are described. Simulation sites in both slow moving and faster reaches of the river are discussed. Thermodynamic processes appear to be sufficient to produce breakup without the additional simulation of mechanical forces. GRA

N82-17583# Foster-Miller Associates, Inc., Waltham, Mass.
DEVELOPMENT OF A MAN AND SUPPLY HOISTING SYSTEM FOR UNDERGROUND METAL AND NONMETAL MINES, VOLUME 1 Final Report, Jun. 1975 - Oct. 1980
David J. Hoadley and Billy C. Brunelle Apr. 1981 150 p refs (Contract DI-BM-HO-25068)
(PB82-113366; BM-OFR-129(1)-81) Avail: NTIS HC A07/MF A01 CSCL 08I

The development and underground operation of a semiautomatic, raise, climber, human and supply hoist system designed for stope access in underground metal and nonmetal mines is described. The system has the capability of operating in crooked raises because the conveyance climbs two stationary wire ropes suspended down the raise. The drive unit is electrically powered with power and control signals supplied to the drive unit through in armored cable also suspended down the raise. The system is designed for portability, ease of installation, and minimum raise development. GRA

N82-17584# Energy Resources Co., Inc., Cambridge, Mass.
MONITORING TO DETECT GROUNDWATER PROBLEMS RESULTING FROM ENHANCED OIL RECOVERY Final Report
Ron Beck, Bernard Aboba, Douglas Miller, and Ivor Kaklins Oct. 1981 146 p refs
(Contract EPA-68-03-2648)
(PB82-119074; EPA-600/2-81-241) Avail: NTIS HC A07/MF A01 CSCL 08H

A four stage monitoring program to detect groundwater contamination events that may potentially result from enhanced oil recovery (EOR) projects was developed. The monitoring system is based on a statistical analysis evolving from a series of equations that model subsurface transport of EOR spills. Results of the design include spatial and frequency monitoring intervals that depend on properties of the local geology and dispersion characteristics of the potential contaminants. GRA

N82-17585# Ohio River Basin Commission, Cincinnati.
CUMBERLAND RIVER BASIN; REGIONAL WATER AND LAND RESOURCES PLAN
Jun. 1981 384 p refs Sponsored in part by Water Resources Council
(PB82-111501) Avail: NTIS HC A17/MF A01 CSCL 08H

The report is on the regional water resources management plan for the Cumberland River Basin in Virginia, Kentucky and Tennessee. An executive summary, recommended plans, and directions for the future are presented. M.D.K.

N82-17586# Geological Survey, Albany, N.Y. Water Resources Div.
NITROGEN IN GROUND WATER AND SURFACE WATER FROM SEWERED AND UNSEWERED AREAS, NASSAU COUNTY, LONG ISLAND, NEW YORK Final Water-Resources Investigation Report, 1952-1976
Stephen E. Ragone, Brian G. Katz, Grant E. Kimmel, and Juli B. Lindner 1981 74 p refs Revised Prepared in cooperation with Nassau County Dept. of Public Works
(PB82-109885; USGS/WRD/WRI/81-022; WRI-80-21) Avail: NTIS HC A04/MF A01 CSCL 08H

Areal and temporal distributions of nitrogen in ground water are correlated with natural and main-induced factors. These factors include hydrogeologic conditions, methods of sewage disposal, pumpage rate for public-water supply, and the types and relative importance of point and nonpoint sources of nitrate entering the ground water. The area discussed is limited to the areas south of the regional ground-water divide. T.M.

N82-17587# Geological Survey, Salt Lake City, Utah. Water Resources Div.
WATER RESOURCES DATA FOR UTAH, WATER YEAR 1980 Annual Water-data Report, 1 Oct. 1979 - 30 Sep. 1980
Jun. 1981 703 p refs
(PB82-108606; USGS/WRD/HD-81-070; USGS/WRD/UT-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Water resources data for the 1980 water year for Utah consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of ground water. This report contains discharge records for 294 gaging stations; stage and contents for 22 lakes and reservoirs; water quality for 64 hydrologic stations, 194 partial-record stations, and 323 wells; and water levels for 36 observation wells. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements. These data represent that part of the National Water Data System collected by the U.S. Geologial Survey and cooperating State and Federal agencies in Utah. GRA

N82-17588# Hawaii Univ., Honolulu. Water Resources Research Center.
WATER QUALITY SIMULATION IN WAHIAWA RESERVOIR, O'AHU, HAWAII
Stephen F. Moore, G. Stephen Lowry, George P. Young, and Reginald H. F. Young Mar. 1981 56 p refs
(Contracts DI-14-34-0001-0113; DI-14-34-0001-1113; OWRT Proj. A-085-HI(1))
(PB82-108499; TMR-64; W81-05705; OWRT-A-085-HI(1)) Avail: NTIS HC A04/MF A01 CSCL 08H

To assist decision makers in selecting alternative water quality management strategies, the Water Quality for River-Reservoir Systems (WQRRS) model developed fo the U.S. Army Corps of Engineers was applied to the multiple-use, Wahiawa Reservoir, which has historically experienced water quality problems-especially low dissolved oxygen (DO) concentrations. The WQRRS model was calibrated and verified to adequately represent dynamic behavior of vertical profiles of water temperature and DO. Principal recommendations are to refine model calibrations, modify the model for artifical aeration simulation, and investigate other management strategies. GRA

N82-17589# National Ocean Survey, Rockville, Md.
GREAT LAKES WATER LEVELS, 1980. DAILY AND MONTHLY AVERAGE WATER SURFACE ELEVATIONS
1981 244 p

(PB82-107608; NOAA-81081106) Avail: NTIS HC A11/MF A01 CSCL 08H

Great Lakes water level gage records in both feet and meters are presented. Shown in tabular form for the calendar year are daily and monthly average levels for each gage in the network, the highest and lowest daily average level for each month, a frequency distribution of daily average levels showing the number of times each month the recorded levels were at, or above, specific elevations, and monthly average level stages for each lake from 1900 to the present. Author (GRA)

N82-17590# New England River Basins Commission, Boston, Mass.

CONNECTICUT COASTAL RIVER BASINS OVERVIEW: PUBLIC REVIEW DRAFT

Jul. 1981 175 p refs Sponsored in part by Water Resources Council, Washington, D.C. Original contains color illustrations (PB82-105925) Avail: NTIS HC A08/MF A01 CSCL 08H

The Connecticut Coastal River basins contain numerous small rivers and streams that drain into Long Island Sound from 1,102 square miles in Connecticut and 47 square miles in New York. The basins exhibit a continuum of development, generally decreasing in intensity from west to east along the coast and from south to north away from Long Island Sound, with the exception of the urbanized Quinnipiac River Valley. Water resource problems in the basins include insufficient public water supplies in the western coastal area; coastal flooding and erosion; limited recreation opportunities, particularly for salt water swimming; and poor water quality. Author (GRA)

N82-17591# Geological Survey, Helena, Mont. Water Resources Div.

POTENTIAL EFFECTS OF URBANIZATION ON PEAK FLOWS IN RATTLESNAKE CREEK, MISSOULA COUNTY, MONTANA Final Water-Resources Investigations.

Charles Parrett Aug. 1981 25 p refs (PB82-102583: USGS/WRD/WRI/81-080; USGS/WRI-81-34) Avail: NTIS HC A02/MF A01 CSCL 08H

The potential effects of urbanization on the one-percent-chance flood on Rattlesnake Creek near Missoula, were assessed using a rainfall-runoff hydrograph model. The model, TR-20, was used to generate a one-percent-chance flood hydrography for existing conditions, natural (no-urban-development) conditions, and three different levels of potential future urbanization provided by the Missoula Planning Office. Author (GRA)

N82-17592# Texas Univ., Austin. Center for Research on Water Resources.

STREAMFLOW ASSESSMENT FOR COUNTIES

Leo R. Beard and Shin Chang 1 May 1981 31 p refs Sponsored in part by Water Resources Council, Washington, D.C. (PB82-102450) Avail: NTIS HC A03/MF A01 CSCL 08H

The feasibility of water assessments at the county level subdivision is determined. It is desirable to obtain water availability data for political subdivisions so that they can be coordinated with census and other pertinent information that is gathered by political subdivision. GRA

N82-17593# Geological Survey, Menlo Park, Calif. Water Resources Div.

DIGITAL MODEL OF THE UNCONSOLIDATED AQUIFER SYSTEM IN THE MODESTO AREA, STANISLAUS AND SAN JOAQUIN COUNTIES, CALIFORNIA Final Water-resources Investigations

Clark J. Londguist Jul. 1981 43 p refs Prepared in cooperation with City of Modesto, Calif. (PB82-102559: USGS/WRD/WRI/81-081; USGS/WRI-81-12) Avail: NTIS HC A03/MF A01 CSCL 08H

A model was developed which can be used to determine the effects of increased pumping and water use on future water levels in the aquifer system. The model is divided into two layers or units that represent the unconsolidated alluvial deposits in the area. The lower unit in the model, called unit 1, represents an aquifer that is both confined and unconfined depending on location. The aquifer is confined in the western part of the study area by a clay bed 20 to 100 feet thick. Elsewhere, the aquifer is unconfined. GRA

N82-17594# Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.

REVEGETATING STRIP-MINED LAND WITH MUNICIPAL SEWAGE SLUDGE Final Report, Nov. 1976 - Oct. 1979

William E. Sopper and Sonja N. Kerr Sep. 1981 162 p refs Prepared in cooperation with Pennsylvania Dept. of Environmental Resources

(Grant EPA-S-804511)

(PB82-102484; EPA-600/2-81-182) Avail: NTIS HC A08/MF A01 CSCL 08I

Three sites representative of abandoned barren bituminous and anthracite mines were treated with various types of municipal sludge at high and low application rates and broadcast seeded with a mixture of greases and legumes. A monitoring system was installed at each demonstration site to determine the effects of the sludge applications on groundwater and soil percolate water chemical and bacteriological quality, chemical properties of the soil, and quality and growth of vegetative cover. GRA

N82-17595# Institute of Gas Technology, Chicago, Ill.

ANALYSIS OF GEOPRESSURED AQUIFERS Annual Report, Jan. - Dec. 1980

M. G. Doherty Aug. 1981 155 p refs

(Contract GRI-5011-310-0109)

(PB82-103862; GRI-80/0072) Avail: NTIS HC A08/MF A01 CSCL 08I

The Institute of Gas Technology undertook technical and economic analyses of the coproduction of water and gas from watered-out geopressured gas caps, hydropressured aquifers, and low-permeability geopressured aquifers for the Gas Research Institute. Out of over 100,000 wells screened in Louisiana and Texas, 489 were identified as having watered out under a strong water drive, making them possible candidates for watered-out geopressured gas cap wells. GRA

N82-17596# Bureau of Mines, Tuscaloosa, Ala.

DEWATERING FLORIDA PHOSPHATIC CLAY WASTES WITH MOVING SCREENS

Luther Warren Brandt Jul. 1981 22 p refs (PB82-104373; BM-RI-8529; LC-80-607788) Avail: NTIS HC A02/MF A01 CSCL 08I

Various means of dewatering Florida phosphatic clay wastes and reclaiming mined lands were investigated and a technique to effectively dewater phosphatic clay wastes was developed. Solids in the clay waste slurry were slowly compressed by moving wire mesh screens through the system. In a typical application, the screens were moved downward, compressing solids ahead of the screens. The rate of movement of the screens is an important variable in the process. It is believed that the moving screens distort the gel structure of the phosphatic clay system and cause the release of water. Samples of 18 clay wastes, including a high-grade attapulgite from beneficiation plants of the Florida phosphate field, were studied using the method.GRA

N82-17597# Southwest Research Inst., San Antonio, Tex. Dept. of Mining Technology.

STUDY OF AIR COMPRESSOR HAZARDS IN UNDERGROUND AND SURFACE MINES Open File Report, Nov. 1979 - Jan. 1981

Martin B. Treuhaft and B. Chope Dial Jan. 1981 93 p refs (Contract DI-BM-JO-10006)

(PB82-105164; BM-OFR-122-81) Avail: NTIS HC A05/MF A01 CSCL 08I

Air compressor hazards in mines are analyzed and guidelines for eliminating fires, explosions, and their operational hazards that can result when compressors are used in coal and metal nonmetal mining applications are presented. Government data bases and reports for mine accident are reviewed and examined. Foreign and domestic standards, regulations, and codes governing air compressor usage are discussed and compared industry trends toward air compressor usage are considered and their impact on compressor safety is analyzed. Recommendations are directed toward MSHA, mine management, and the Bureau of Mines regarding their involvement in accident reporting and prevention. GRA

N82-17598# Bureau of Mines, Washington, D. C. Office of Minerals Information and Analysis.

MINERALS YEARBOOK, 1978-79. VOLUME 2: AREA REPORTS, DOMESTIC
Jul. 1981 605 p
(PB82-105248; BM-MYB-1977-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 08I

Data is presented on crude nonfuel mineral production in each of the 50 States, the U.S. possessions in the Pacific Ocean and the Caribbean Sea, and the Commonwealth of Puerto Rico. A statistical summary is included. GRA

N82-17599 Colorado State Univ., Fort Collins.
REGIONAL PROPERTIES OF ANGULAR REFLECTANCE MODELS Ph.D. Thesis
John Michael Davis 1981 215 p
Avail: Univ. Microfilms Order No. 8126427

The inference of the reflected flux density from satellite radiance measurements requires a knowledge of the angular properties of the reflected radiance field. The angular dependence and the spatial variability of the radiance fields reflected from 30 regional atmospheric scenes were examined. The reflected radiance data set was collected from a high altitude aircraft during the Summer Monsoon Experiment using a unique multi-detector instrument which permitted an instantaneous sampling of the radiance fields from twelve angular veiwing coordinates. All of the scenes display sufficient anisotropy to conclude that neglecting the angular variation of the reflected radiances would lead to significant errors (10-100%) in the inferred flux density. Radiances over the relatively isotropic scenes converge to their regional mean values on a spatial scale which is small compared to that of the total region. Dissert. Abstr.

N82-17600 Columbia Univ., New York.
ADDITION OF RADIOCARBON TO THE MIXED-LAYERS OF TWO SMALL LAKES: PRIMARY PRODUCTION, GAS EXCHANGE, SEDIMENTATION AND CARBON BUDGET Ph.D. Thesis
Peter Michael Bower 1981 259 p
Avail: Univ. Microfilms Order No. 8125254

Addition of radiocarbon to the mixed layers of two small dimictic lakes made it possible to assess the validity of enclosing natural phytoplankton populations in bottles for the purpose of estimating primary production. Simultaneous determinations of daily integral primary production by the C-14 method were made by 4 and 16 hour in situ incubations, by an incubator based numerical model, and by dawn and dusk sampling of the mixed layer. Estimates of productivity from the in situ incubations averaged 0.73 and 0.87 of the whole lake results with the underestimation never more than 60%. Productivity results for the incubator model averaged from 0.77 to 0.93 of the whole lake values. Strong surface inhibition of photosynthesis was observed in the vertical profiles of production. It is argued that this strong surface depression of photosynthesis is an artifact of the stationary position of the bottles and the unnaturally long exposure to supraoptimal light. A correction for daytime respiration of C-14 incorporated on previous days suggests that whole lake productivity is significantly enhanced over that measured in bottles. Dissert. Abstr.

N82-17601 Michigan Univ., Ann Arbor.
SPECTRAL REFLECTANCES OF FRESHWATER ICE AND SNOW FROM 340 THROUGH 1100 nm Ph.D. Thesis
Stanley Joseph Bolsenga 1981 159 p
Avail: Univ. Microfilms Order No. 8125073

Measured spectral reflectances of new and moderately metamorphosed snow were generally > 80% from 340 to 950 nm. From 950 to 100 nm a characteristic dip and rise of spectral reflectances occurred. One scan over a deteriorated snow patch showed much lower spectral reflectances than fresh snow, but the shape of the curve remained similar to fresher snow. Spectral reflectances for clear ice contrasted sharply with those for snow. In general, values were < 10% and the curves lacked distinctive shape. Higher spectral reflectances, due to lighter colored ice in the measurement area, were measured at some sites. Secondary ice types (refrozen slush, pancake, brash, slush curd) revealed spectral reflectance curves similar in form to each other, but which varied significantly in the range of spectral reflectances for each ice type. All measurements were acquired with a pair of scanning spectroradiometers adapted to obtain automatically simultaneous readings of incident and reflected radiation from 340 to 100 nm. Dissert. Abstr.

N82-17602 Colorado State Univ., Fort Collins.
WATERSHED MODEL STUDY USING LANDSAT DATA Ph.D. Thesis
Tien-Po Chang 1981 331 p
Avail: Univ. Microfilms Order No. 8126421

In connection with the use of remote sensing techniques, a digital terrain model that characterizes geometric features and other terrain conditions of a watershed is necessary for watershed modeling. As a result of constructing a watershed cell system on the digital terrain model, the mathematical formation on simulated physical processes can be simplified since the mathematical expressions only handle the small-sized, well-defined and relatively homogeneous components of the physical processes within a watershed cell. Four submodels that link the processing of the remote sensed data to the watershed analysis were developed. The submodels are LANDSAT image data processing model, digital terrain model, hydrologic simulation model, and landslide-hazard potential delineation model. The structure, function, and computer programs related to these models, along with the results of watershed simulation using the models, are presented and discussed. Dissert. Abstr.

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-17603*# Gilbert/Commonwealth, Reading, Pa.
MAGNETOHYDRODYNAMICS (MHD) ENGINEERING TEST FACILITY (ETF) 200 MWe POWER PLANT CONCEPTUAL DESIGN ENGINEERING REPORT (CDER) Final Report
Sep. 1981 593 p refs
(Contracts DEN3-224; DE-AI01-77ET-10769)
(NASA-CR-165452-Vol-5; DOE/NASA/0224-1-Vol-5) Avail: NTIS HC A25/MF A01 CSCL 10B

The reference conceptual design of the magnetohydrodynamic (MHD) Engineering Test Facility (ETF), a prototype 200 MWe coal-fired electric generating plant designed to demonstrate the commercial feasibility of open cycle MHD, is summarized. Main elements of the design, systems, and plant facilities are illustrated. System design descriptions are included for closed cycle cooling water, industrial gas systems, fuel oil, boiler flue gas, coal management, seed management, slag management, plant industrial waste, fire service water, oxidant supply, MHD power train, magnet, heat recovery/seed recovery, inverter, heating, ventillating, and air conditioning, and electrical. N.W.

N82-17604*# Spectrolab, Inc., Sylmar, Calif.
DESIGN, ANALYSIS, AND TEST VERIFICATION OF ADVANCED ENCAPSULATION SYSTEMS Interim Report, period ending 1 Oct. 1980
Alec Garcia and Chuck Minning Nov. 1981 178 p refs
Sponsored in part by DOE Prepared for JPL
(Contract JPL-955567)
(NASA-CR-168407; DOE/JPL-955567-81/4; JPL-9950-619)
Avail: NTIS HC A09/MF A01 CSCL 10A

Thermal, optical, structural, and electrical isolation analyses are decribed. Major factors in the design of terrestrial photovoltaic modules are discussed. Mechanical defects in the different layers of an encapsulation system, it was found, would strongly influence the minimum pottant thickness required for electrical isolation. Structural, optical, and electrical properties, a literature survey indicated, are hevily influenced by the presence of moisture. These items, identified as technology voids, are discussed. Analyses were based upon a 1.2 meter square module using

10.2 cm (4-inch) square cells placed 1.3 mm apart as shown in Figure 2-2. Sizing of the structural support member of a module was determined for a uniform, normal pressure load of 50 psf, corresponding to the pressure difference generated between the front and back surface of a module by a 100 mph wind. Thermal and optical calculations were performed for a wind velocity of 1 meter/sec parallel to the ground and for module tilt (relative to the local horizontal) of 37 deg. Placement of a module in a typical array field is illustrated. N.W.

N82-17605*# Spectrolab, Inc., Sylmar, Calif.
DESIGN, ANALYSIS, AND TEST VERIFICATION OF ADVANCED ENCAPSULATION SYSTEMS Triannual Report, Period ending 31 Jul. 1981
Alec Garcia and Chuck Minning Nov. 1981 27 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-955567)
(NASA-CR-168406; DOE/JPL-955567-81/5; JPL-9950-620) Avail: NTIS HC A03/MF A01 CSCL 10A

The construction of optical and electrical verification test coupons is detailed. Testing of these coupons was completed and the results are presented. Additionally, a thermal simulation of roof mounted array conditions was done and the results documented. Author

N82-17606*# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
OVERVIEW STUDY OF SPACE POWER TECHNOLOGIES FOR THE ADVANCED ENERGETICS PROGRAM
R. Taussig, S. Gross, A. Millner, M. Neugebauer, W. Phillips, J. Powell, E. Schmidt, M. Wolf, and G. Woodcock Oct. 1981 341 p refs
(Contract NAS3-22477)
(NASA-CR-165269; MSNW-1169) Avail: NTIS HC A15/MF A01 CSCL 10B

Space power technologies are reviewed to determine the state-of-the-art and to identify advanced or novel concepts which promise large increases in performance. The potential for incresed performance is judged relative to benchmarks based on technologies which have been flight tested. Space power technology concepts selected for their potentially high performance are prioritized in a list of R & D topical recommendations for the NASA program on Advanced Energetics. The technology categories studied are solar collection, nuclear power sources, energy conversion, energy storage, power transmission, and power processing. The emphasis is on electric power generation in space for satellite on board electric power, for electric propulsion, or for beamed power to spacecraft. Generic mission categories such as low Earth orbit missions and geosynchronous orbit missions are used to distinguish general requirements placed on the performance of power conversion technology. Each space power technology is judged on its own merits without reference to specific missions or power systems. Recommendations include 31 space power concepts which span the entire collection of technology categories studied and represent the critical technologies needed for higher power, lighter weight, more efficient power conversion in space. Author

N82-17607*# United Technologies Corp., South Windsor, Conn. Power Systems Div.
ELECTROCHEMICAL ENERGY STORAGE FOR AN ORBITING SPACE STATION
R. E. Martin Dec. 1981 61 p refs
(Contract NAS3-21293)
(NASA-CR-165436; FCR-3142) Avail: NTIS HC A04/MF A01 CSCL 10C

The system weight of a multi hundred kilowatt fuel cell electrolysis cell energy storage system based upon alkaline electrochemical cell technology for use in a future orbiting space station in low Earth orbit (LEO) was studied. Preliminary system conceptual design, fuel cell module performance characteristics, subsystem and system weights, and overall system efficiency are identified. The impact of fuel cell module operating temperature and efficiency upon energy storage system weight is investigated. The weight of an advanced technology system featuring high strength filament wound reactant tanks and a fuel cell module employing lightweight graphite electrolyte reservoir plates is defined. E.A.K.

N82-17608*# Eaton Engineering and Research Center, Southfield, Mich. Engineering and Research Center.
STRAIGHT AND CHOPPED DC PERFORMANCE DATA FOR A RELIANCE EV-250AT MOTOR WITH A GENERAL ELECTRIC EV-1 CONTROLLER Final Report
Paul C. Edie Sep. 1981 58 p
(Contracts DEN3-123; DE-AI01-77CS-51044)
(NASA-CR-165447; DOE/NASA/0123-3; ERC-TR-8175) Avail: NTIS HC A04/MF A01 CSCL 10B

Straight and chopped DC motor performances for a Reliance EV-250AT motor with an EV-1 controller were examined. Effects of motor temperature and operating voltage are shown. It is found that the maximum motor efficiency is approximately 85% at low operating temperatures in the straight DC mode. Chopper efficiency is 95% under all operating conditions. For equal speeds, the motor operated in the chopped mode develops slightly more torque and draws more current than it does in the straight DC mode. E.A.K.

N82-17609*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SATELLITE POWER SYSTEM. CONCEPT DEVELOPMENT AND EVALUATION PROGRAM, VOLUME 6: CONSTRUCTION AND OPERATIONS
Harold Benson and Lyle M. Jenkins Apr. 1981 216 p refs
(NASA-TM-58233; JSC-17220-Vol-6) Avail: NTIS HC A10/MF A01 CSCL 10A

The construction, operation, and maintenance requirements for a solar power satellite, including the space and ground systems, are reviewed. The basic construction guidelines are explained, and construction location options are discussed. The space construction tasks, equipment, and base configurations are discussed together with the operations required to place a solar power satellite in geosynchronous orbit. A rectenna construction technique is explained, and operation with the grid is defined. Maintenance requirements are summarized for the entire system. Key technology issues required for solar power satellite construction operations are defined. E.A.K.

N82-17610*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RESULTS OF THE 1981 NASA/JPL BALLOON FLIGHT SOLAR CELL CALIBRATION PROGRAM
C. H. Seaman and R. S. Weiss 15 Jan. 1982 16 p refs
(Contract NAS7-100)
(NASA-CR-168442; JPL-Pub-81-115) Avail: NTIS HC A02/MF A01 CSCL 10A

The calibration of the direct conversion of solar energy through use of solar cells at high altitudes by balloon flight is reported. Twenty seven modules were carried to an altitude of 35.4 kilometers. Silicon cells are stable for long periods of time and can be used as standards. It is demonstrated that the cell mounting cavity may be either black or white with equal validity in setting solar simulators. The calibrated cells can be used as reference standards in simulator testing of cells and arrays. E.A.K.

N82-17611*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SENSITIVITY ANALYSIS OF THE ADD-ON PRICE ESTIMATE FOR THE SILICON WEB GROWTH PROCESS
Anant R. Mokashi 15 Dec. 1981 37 p refs
(Contracts NAS7-100; DE-AI01-76ET-20356; JPL Proj. 5101-175)
(NASA-CR-168422; JPL-5101-175; DOE/JPL-1012-61) Avail: NTIS HC A03/MF A01 CSCL 10A

The web growth process, a silicon-sheet technology option, developed for the flat plate solar array (FSA) project, was examined. Base case data for the technical and cost parameters for the technical and commercial readiness phase of the FSA project are projected. The process add on price, using the base case data for cost parameters such as equipment, space, direct labor, materials and utilities, and the production parameters such as growth rate and run length, using a computer program developed specifically to do the sensitivity analysis with improved price estimation are analyzed. Silicon price, sheet thickness and cell efficiency are also discussed. E.A.K.

N82-17612*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A NORMATIVE PRICE FOR ENERGY FROM AN ELECTRICITY GENERATION SYSTEM: AN OWNER-DEPENDENT METHODOLOGY FOR ENERGY GENERATION (SYSTEM) ASSESSMENT (OMEGA). VOLUME 1: SUMMARY
Robert G. Chamberlain and Kirby M. McMaster 15 Oct. 1981 62 p refs Sponsored by NASA and DOE 2 Vol.
(NASA-CR-168432; JPL-Pub-81-86-Vol-1; DOE/ET-20356/5) Avail: NTIS HC A04/MF A01 CSCL 10B

The utility owned solar electric system methodology is generalized and updated. The net present value of the system is determined by consideration of all financial benefits and costs (including a specified return on investment). Life cycle costs, life cycle revenues, and residual system values are obtained. Break even values of system parameters are estimated by setting the net present value to zero. While the model was designed for photovoltaic generators with a possible thermal energy byproduct, it applicability is not limited to such systems. The resulting owner-dependent methodology for energy generation system assessment consists of a few equations that can be evaluated without the aid of a high-speed computer. S.L.

N82-17613*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A NORMATIVE PRICE FOR ENERGY FROM AN ELECTRICITY GENERATION SYSTEM: AN OWNER-DEPENDENT METHODOLOGY FOR ENERGY GENERATION (SYSTEM) ASSESSMENT (OMEGA). VOLUME 2: DERIVATION OF SYSTEM ENERGY PRICE EQUATIONS
Robert G. Chamberlain and Kirby M. McMaster 15 Oct. 1981 100 p refs Sponsored in part by DOE 2 Vol.
(Contracts NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-168433; JPL-Pub-81-86-Vol-2; DOE/ET-20356/5) Avail: NTIS HC A05/MF A01 CSCL 10B

The methodology presented is a derivation of the utility owned solar electric systems model. The net present value of the system is determined by consideration of all financial benefits and costs including a specified return on investment. Life cycle costs, life cycle revenues, and residual system values are obtained. Break-even values of system parameters are estimated by setting the net present value to zero. S.L.

N82-17614*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE 18TH PROJECT INTEGRATION MEETING Progress Report, Feb. - Jul. 1981
Jul. 1981 577 p refs Meeting held at Pasadena, Calif., 15-16 Jul. 1981
(Contract NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-168431; JPL-Pub-81-94; JPL-5101-186) Avail: NTIS HC A25/MF A01 CSCL 10A

Progress in the low cost solar array project during the period February to July 1981 is reported. Included are: (1) project analysis and integration; (2) technology development in silicon material, large area silicon sheer and encapsulation; (3) process development; (4) engineering, and operations. E.A.K.

N82-17615*# Stonehart Associates, Inc., Madison, Conn.
PREPARATION AND EVALUATION OF ADVANCED ELECTROCATALYSTS FOR PHOSPHORIC ACID FUEL CELLS Quarterly Report, Oct. - Dec. 1981
Paul Stonehart, John Baris, John Hochmuth, and Peter Pagliaro Dec. 1981 44 p
(Contract DEN3-176; Contract DE-AI03-80ET-17088)
(NASA-CR-165594; DOE/NASA/0176-81/5; QR-8) Avail: NTIS HC A03/MF A01 CSCL 10A

Two cooperative phenomena are required the development of highly efficient porous electrocatalysts: (1) is an increase in the electrocatalytic activity of the catalyst particle; and (2) is the availability of that electrocatalyst particle for the electromechanical reaction. The two processes interact with each other so that improvements in the electrochemical activity must be coupled with improvements in the availability of the electrocatalyst for reaction. Cost effective and highly reactive electrocatalysts were developed. The utilization of the electrocatalyst particles in the porous electrode structures was analyzed. It is shown that a large percentage of the electrocatalyst in anode structures is not utilized. This low utilization translates directly into a noble metal cost penalty for the fuel cell. E.A.K.

N82-17616# Los Alamos Scientific Lab., N. Mex.
DOE-2 VERIFICATION PROJECT, PHASE 1 Interim Report
Stephen C. Diamond, Bruce D. Hunn, and Charlene C. Cappiello Apr. 1981 74 p refs
(Contract W-7405-eng-36)
(LA-8295-MS) Avail: NTIS HC A04/MF A01

Phase 1, an analytical and empirical verification of DOE-2 as computational algorithms, is reported. DOE-2 is a computer program developed to provide architect/engineers with a public domain tool for energy analysis buildings. Results of a comparison of plant equipment performance default values with manufacturer's data, and results of a series of comparisons of DOE-2 solar simulator predictions with predictions of other solar system simulation computer programs. Results of empirical tests of the full DOE-2 program are also presented, including comparisons with measured monthly and annual energy consumption for seven commercial buildings located in seven different cities and for nine elementary schools. Comparisons of predicted results of several building energy analysis computer programs are reported. E.A.K.

N82-17617# Kernforschungsanlage, Juelich (West Germany).
IMPLEMENTING AGREEMENT FOR A PROGRAM OF RESEARCH AND DEVELOPMENT ON WIND ENERGY CONVERSION SYSTEMS
Apr. 1981 109 p refs Partly in ENGLISH and GERMAN Presented at 1981 Meeting of Experts of Annex 3 and 3a on Integration of Wind Power into Natl. Elec. Supply Systems, Regensburg, West Germany, 29-30 Jan. 1981 Sponsored by Bundesministerium fuer Forschung und Technol. and Regensburg Univ., West Germany
(Juel-Spez-108; ISSN-0343-7639) Avail: NTIS HC A06/MF A01

The technical and economic feasibility of wind power electric generation in Germany and the Netherlands is discussed. Problems of power output fluctuations are considered. For individual titles, see N82-17618 through N82-17625.

N82-17618# Kernforschungsanlage, Juelich (West Germany).
METEOROLOGICAL DATA BASIS
L. Jarass (ATW, G.M.B.H., Regensburg, West Germany) *In its* Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 1-16 (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

Wind speed and direction data from 16 observation points in the Federal Republic of Germany are evaluated. Hourly mean figures for wind speed and direction, measured at heights of 10 m to 30 m above ground, for the years 1969 to 1976 at coastal stations and for the years 1969 and 1972 at inland stations, are analyzed. Daily and seasonal time variations and the temporal distribution of wind speed, lulls, and correlation and autocorrelation of wind speeds are considered and charted. Extreme velocities are discussed. A general evaluation of possible sites for wind power generation facilities is presented. J.D.H.

N82-17619# Regensberg Univ. (West Germany). Inst. fuer Physik.
ASSESSMENT OF TECHNICAL POTENTIAL: PROBLEMS, METHODS AND RESULTS
G. Obemair *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 17-28 (For primary document see N82-17617 08-44)
Avail: NTIS HC A06/MF A01

The technical and economic problems posed by the integration of wind energy into the electric power supply system are considered. Stability and control requirements, the efficiency of wind converters and the exclusion of technically inaccessable areas are applied to the stochastic wind field over the total area. The resulting technical potential is then reduced to an economic potential by applying an economic filter which involves competitiveness measured against other energy sources, comparative social costs and socio-economic prefer-

ences, and the actual cost and existing use of land for wind energy parks. J.D.H.

N82-17620# Regensberg Univ. (West Germany). Inst. fuer Volkswirtschaft.

ECONOMIC EVALUATION

L. Hoffman *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 28-37 (For primary document see N82-17617 08-44)

Avail: NTIS HC A06/MF A01

The economic significance of wind energy is assessed on the basis of its potential contribution to Germany's energy supply, its competitiveness vis-a-vis other energy sources, and its social desirability, measured by its contribution to the realization of general socio-economic goals. J.D.H.

N82-17621# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.

ASSESSMENT OF THE POTENTIAL OF LWECS IN THE NETHERLANDS

W. Dub *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 41-62 refs (For primary document see N82-17617 08-44)

Avail: NTIS HC A06/MF A01

The potential of large wind energy conversion systems (LWECS) in the Netherlands is assessed. Hourly data on mean wind speeds and wind directions from 5 stations are analyzed and extrapolated up to a height of 100 m and monthly and annual mean wind speeds. The wind power conversion efficiency of wind turbines and the monthly and annual energy production of WECS 1 are calculated. The daily wind energy production of a compound system of 3 MW wind turbines and the daily percentages of the 1980 national electric power needs they would meet are determined using 1975 wind data. The number of 3 MW and 0.8 MW wind turbines required to produce 9.97 TWh per year is determined. J.D.H.

N82-17622# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.

POWER FLUCTUATIONS: TECHNICAL AND STATISTICAL ASPECTS

H. Pape *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 63-70 refs (For primary document see N82-17617 08-44)

Avail: NTIS HC A06/MF A01

Electric power output fluctuations from wind turbines occurring within minutes are considered. Means of regulating the fluctuations are discussed. A statistical proof that an increasing number of wind turbines tends to generate a more regular power output than each individual wind turbine is presented. J.D.H.

N82-17623# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.

FORECASTING WIND POWER OUTPUT

W. Dub *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 71-80 refs (For primary document see N82-17617 08-44)

Avail: NTIS HC A06/MF A01

Long term forecasts of electric energy output from wind power are presented. Periods of 2-6 hours, 6-12 hours, 12-24 hours, and 24-48 hours are considered. The prediction of wind speed is discussed. It is determined that, having a good estimator of the mean wind speed V sub T for a planning period T, the mean wind power output will be underestimated, so long as the wind speed used is the range of cut-in and rated speeds. J.D.H.

N82-17624# Regensberg Univ. (West Germany). Forschungsprojekt Windenergie.

ASSURED LOAD CARRYING CAPABILITY AND CAPACITY CREDIT

H. Pape *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 81-95 refs (For primary document see N82-17617 08-44)

Avail: NTIS HC A06/MF A01

The determination of assured load carrying capability and the capacity credit for use in planning windpowered electric generation facilities is considered. Calculation of the available capacity of thermal power plants is described and compared with calculation of available capacity for wind turbines, taking into account outages caused by the unavailability of the primary energy, wind. The assured load carrying capability of power plants is defined. An operational definition of the capacity credit of wind turbines as related to a fixed time t Epsilon T is presented and extended to the period T. J.D.H.

N82-17625# Gesamthochschule, Kassel (West Germany). Fachbereich Elektrotechnik.

POSSIBILITIES FOR AVOIDING STRONG VARIATIONS OF THE ELECTRICAL OUTPUT POWER OF WIND ENERGY SYSTEMS [MOEGLICHKEITEN ZUR VERMEIDUNG VON STARKEN SCHWANKUNGEN DER ELEKTRISCHEN ABGABELEISTUNG VON WINDENERGIEANLAGEN]

G. Cramer *In* Kernsforschungsanlage Implementing Agreement for a Program of Res. and Develop. on Wind Energy Conversion Systems Apr. 1981 p 96-99 refs (For primary document see N82-17617 08-44)

Avail: NTIS HC A06/MF A01

The conversion of the kinetic energy of wind into electric power through wind powered converters by the primary energy of atmospheric circulation speed is discussed. It is suggested that wind powered generators which work with the supply network should avoid overloading the installation from wind performance caused by a fast change of the blade pitch. There are possibilities to achieve numerical comparison of the temporary storage performance of kinetic energy by application of rotating masses with flywheels, which allow for rotation speed variations. Through the feed of direct or alternate current in the rotor cycle form asynchronic machines with slip rings or through the influence of the slip performance a speed of variable duty on the network is accomplished. E.A.K.

N82-17626# Defence Research Establishment, Ottawa. (Ontario). Chemical Souces Section.

SAFETY DESIGN CONSIDERATIONS FOR LITHIUM BATTERIES IN CF APPLICATIONS

Walter J. Moroz Feb. 1981 21 p refs In ENGLISH; FRENCH summary Presented at the 11th Meeting of the DND Directors Comm. on Res. Requirements and Develop., Sep. 1980

(AD-A107619; DREO-TN-81-11) Avail: NTIS HC A02/MF A01 CSCL 10/3

Lithium-sulphur dioxide (Li-SO2) primary cells are being introduced as power supplies into Canadian Forces applications where advantage can be taken of their high energy density characteristics and low temperature capabilities. For safety reasons the high energy capabilities of these cells must be protected against the possibility of accidental abuse. DREO has investigated and identified a number of operational problem areas associated with Li-SO2 systems. Safety design considerations are proposed for three CF applications; the PRC 515 Radio Set/Radar Transponder SST-181X applications and the AN/PRQ-501 Personal Locater Beacon. Author (GRA)

N82-17627# Air Force Academy, Colo. Directorate of Chemical Sciences.

A NEW CLASS OF ROOM TEMPERATURE MOLTEN SALTS FOR BATTERY APPLICATIONS Interim Report, Sep. 1980 - Sep. 1981

John S. Wilkes, Joseph A. Levisky, John S. Landers, Robert L. Vaughn, Charles L. Hussey, Danilo A. Floreani, and Daniel J. Stech Oct. 1981 32 p refs Presented at the AFSC/NAVMAT Sci. and Eng. Symp., Wright-Patterson AFB, Ohio, 27-29 Oct. 1981

(Contract AF Proj. 2303)

(AD-A107989; FJSRL-TR-81-0011) Avail: NTIS HC A03/MF A01 CSCL 07/4

Salts that are liquid at room temperature would provide a completely ionic electrolyte for rechargeable batteries without the penalty of high operating temperatures. We have discovered and characterized a new class of molten salts that are liquids considerably below room temperature. The new materials are

mixtures of dialkyimidazolium chlorides and aluminum chloride. The solid-liquid phase diagram of one member of the class shows that the material is liquid below room temperature over its entire composition range. A proof of concept battery cell using the new electrolyte was demonstrated. Electrochemical tests show that battery anodes and cathodes will operate in the new electrolytes. By varying the ratio of the components of the new melts, the chemical and physical properties can be changed over a very wide range. Author (GRA)

N82-17628# Jydsk Telefon A/S Biblioteket, Aarhus-Tranbjerg J. (Denmark).
SOLAR-CELL PROJECT Progress Report
B. Mortensen and Johs Jensen (Odense Univ.) Aug. 1980 42 p refs In DANISH
(DE82-901191; NP-2901191; PR-1) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

Commercially available solar cells and battery systems were tested. The details of the experimental solar cell/battery array placed on the roof of the Jutland Telephone telestation near Aarhus, Denmark are described. A survey of module calculations and meteorological data in this region is given. The systems tested, their components, solar cell arrays and mechanical and electrical equipment are described and measuring methods and data processing are outlined. DOE

N82-17629# Amax Exploration, Inc., Wheat Ridge, Colo.
TUSCARORA AREA, NEVADA: GEOTHERMAL RESERVOIR ASSESSMENT CASE HISTORY, NORTHERN BASIN AND RANGE Final Report, 1 Oct. 1978 - 9 Sep. 1980
H. D. Pilkington Aug. 1981 45 p refs
(Contract DE-AC08-79ET-27011)
(DE82-001328; DOE/ET-27011/1) Avail: NTIS HC A03/MF A01

A Geothermal exploration of the Tuscarora prospect consisted of an integrated program of geologic, hydrogeochemical and soil geochemistry studies. Geophysical exploration included: heatflow studies, aeromagnetic, self potential, gravity, dipole-dipole resistivity and magnetotelluric surveys. Exploration drilling includes 32 shallow thermal gradient holes, six intermediate depth temperature gradient wells and one 5454 foot test for discovery well. Shallow low temperature reservoirs were encountered in the Tertiary rocks and in the Paleozoic rocks immediately beneath the Tertiary. DOE

N82-17630# Gilbert (Glen A.) and Associates, Inc., Reading, Pa.
RESEARCH AND EVALUATION OF BIOMASS RESOURCES/CONVERSION/UTILIZATION SYSTEMS. BIOMASS ALLOCATION MODEL. VOLUME 1: TEST AND APPENDICES A & B
R. P. Stringer, Y. K. Ahn, H. T. Chen, R. W. Helm, E. T. Nelson, and K. J. Shields Aug. 1981 222 p refs 2 Vol.
(Contract DE-AC02-78ET-20611)
(DE82-000838; DOE/ET-20611/12-Vol-1; GAI-2204-Vol-1) Avail: NTIS HC A10/MF A01

A biomass allocation model was developed to show the most profitable combination of biomass feedstocks, thermochemical conversion processes, and fuel products to serve the seasonal conditions in a regional market. This optimization model provides a tool for quickly calculating which of a large number of potential biomass missions is the most profitable mission. Other components of the system serve as a convenient storage and retrieval mechanism for biomass marketing and thermochemical conversion processing data. The system can be accessed through the use of a computer terminal, or it could be adapted to a microprocessor. A User's Manual for the system is included. Biomass derived fuels included in the data base are the following: medium Btu gas, low Btu gas, substitute natural gas, ammonia, methanol, electricity, gasoline, and fuel oil. DOE

N82-17631# Gilbert (Glen A.) and Associates, Inc., Reading, Pa.
RESEARCH AND EVALUATION OF BIOMASS RESOURCES/CONVERSION/UTILIZATION SYSTEMS. BIOMASS ALLOCATION MODEL. VOLUME 2: APPENDICES C-E
R. P. Stringer, Y. K. Ahn, H. T. Chen, R. W. Helm, E. T. Nelson, and K. J. Shields Aug. 1981 323 p refs 2 Vol.
(Contract DE-AC02-78ET-20611)
(DE82-000839; DOE/ET-20611/12-Vol-2; GAI-2204-Vol-2) Avail: NTIS HC A14/MF A01

The Biomass Feedstock Allocation Model User's Manual is presented. The results of an economic analysis of biomass thermochemical conversion processes are presented as: a sample computer run for process economics; process cost sensitivity plots (the effect of plant capacity and feedstock cost on product cost); and the results of a computer analysis showing product costs using discounted cash flow and utility financing method. The results of process modeling activities are also included. DOE

N82-17632# Seymour Community Schools, Wis.
COMMUNITY SOLAR DEMONSTRATION/DISSEMINATION CENTER Final Report
Richard Tepp 8 Jul. 1981 14 p
(Contract DE-FG02-80R5-10250)
(DE82-000994; DOE/R5-10250/T1) Avail: NTIS HC A02/MF A01

A passive/active solar heating demonstration component was constructed. A greenhouse was installed, and the active system was completed. The fireplace was also completed. A direct gain 8 by 20 double glazed greenhouse system on concrete footings and masonary blocks was incorporated. The greenhouse includes a 4 in. concrete slab with 2 in. of thermal below grade insulation. Other key elements include a 30 in. hinged entrance door, screens and motor-operated louver vents for summer ventilation. Manual operated dampers are built into the trombe wall, which was constructed as the backdrop of the greenhouse. DOE

N82-17633# Texas Instruments, Inc., Dallas.
DEVELOPMENT OF A SOLAR-ENERGY SYSTEM Technical Summary Report
E. L. Johnson 3 Apr. 1981 23 p
(Contract DE-AC01-79ER-10000)
(DE81-030531; DOE/ER-10000/T2) Avail: NTIS HC A02/MF A01

Solar energy conversion by operation of small silicon solar cells immersed in an electrolyte is described. The current generated by the cells is used to separate the electrolyte into its constituent parts. The system consists of a solar chemical converter in which the electrolyte is separated, hydrogen storage, a fuel cell, and a heat exchanger for recovering heat from the system. Fabrication of the solar cells used in the solar chemical convertor and the storage of hydrogen as a metal hydride are discussed. DOE

N82-17634# Argonne National Lab., Ill. Energy and Environmental Systems Div.
CUSTOMER ATTITUDES TOWARD THERMAL-ENERGY-STORAGE HEATING
H. N. Hersh Jun. 1981 74 p refs
(Contract W-31-109-eng-38)
(DE82-003010; ANL-SPG-17) Avail: NTIS HC A04/MF A01

Attitudes among users of thermal energy storage (TES) heating systems were studied. A customer acceptance survey exploring attitudes and levels of satisfaction, face to face contacts between utility representatives and users, and a survey of pertinent published information are investigated. It is found that: (1) TES heating systems are installed for economic reasons by customers who can afford higher initial costs and understand the concept of lower total cost; and (2) attitudes toward TES are positive. The TES systems are not regarded more favorably than conventional systems, however, and it is likely that lower electric heating bills are responsible for the favorable perceptions of most TES users. DOE

N82-17635# Gould, Inc., Rolling Meadows, Ill.
DEVELOPMENT OF ZINC-BROMINE BATTERIES FOR UTILITY ENERGY STORAGE Monthly Progress Report, Aug. 1981
R. A. Putt 1981 31 p
(Contract DE-AC02-78ET-29345)
(DE82-002114; DOE/ET-29345/T5) Avail: NTIS HC A03/MF A01

Progress is reported on the following tasks related to the development of zinc-bromide batteries: component development

and acceptance, hardware design and construction, and testing. Electrode test cell efficiency data and contract management summary reports are presented in tabular form. M.D.K.

N82-17636*# Thermo Electron Corp., Waltham, Mass.
DOE/JPL ADVANCED THERMIONIC TECHNOLOGY PROGRAM Progress Report, Oct. - Nov. - Dec. 1980
1980 54 p
(Contracts DE-AC02-76ET-11292; JPL-955009)
(NASA-CR-168436; DE81-769295; DOE/ET-11292/T5; COO-3056-62; TE4250/4247-149-81; PR-45) Avail: NTIS HC A04/MF A01 CSCL 10A

Accomplishments in the DOE program include: continuing stable output from the combustion life test of the one-inch diameter hemispherical silicon carbine diode (Converter No. 239) at an emitter temperature of 1730 K for a period of over 4200 hours; construction of four diode module completed; favorable results obtained from TAM combustor-gas turbine system analyses; and obtained a FERP work function of 2.3 eV with the W(100)-O-Zr-C electrode. JPL program accomplishments include: the average minimum barrier index of the last six research diodes built with sublimed molybdenum oxide collectors was 20 eV (WHK). DOE

N82-17637# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamic.
STATIC AND DYNAMIC INVESTIGATIONS OF DIFFERENT TOWERS FOR WIND TURBINES Final Report
J. H. Argyris and K. A. Braun 1980 125 p refs Transl. into ENGLISH of "Statische und dyn. untersuch. verschiedener tuerme fuer windturbinen" Rept. ISD-261 Stuttgart Univ., Stuttgart, 1979 122p Original report in GERMAN previously announced as N81-12628 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-274; ISD-261; ISSN-0170-6071) Avail: NTIS HC A06/MF A01

The kinematics of a cantilevered, a conventional guyed, and a compliant (elastic column held by a rigid framework) tower were studied. The static layout of the towers is established, using the reactions due to different gusts which a two-bladed rotor (120 m diameter) imposes on a rigid support as external loads. The rotor blades are assumed to be inelastic. Each one has a flapping hinge and a flap-pitch coupling. Dynamic responses were calculated by the finite element method. The guyed tower is superior to the cantilevered one. A 10.4 deg inclination angle seems best for the compliant tower, but more dynamic and stability analyses are needed before undertaking further tower geometry optimization. Author (ESA)

N82-17638# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
ROTOR MODEL FOR THE VERIFICATION OF COMPUTATIONAL METHODS Final Report
J. H. Argyris, W. Aicher, F. Karl, W. Kuemmerle, and M. Mueller 1980 66 p refs Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-275; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

A windmill rotor model with 7.3 m rotor diameter was constructed in order to test a data acquisition/transmission system and computational models. Data, e.g., strains, angles, linear movements, accelerations, are measured at the rotor, digitized, and transmitted optoelectronically. Measurements of rotor blade dynamic response to cyclic gravity loading are compared with theoretical values. Deviation between measurements and calculations is 11%. Author (ESA)

N82-17639# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
STATIC INVESTIGATIONS OF ROTOR BLADES UNDER DEADWEIGHT AND DURING STATIONARY OPERATION Final Report
J. H. Argyris, K. A. Braun, and B. Kirchgaessner 1980 62 p refs Transl. into ENGLISH of "Statische untersuch. von rotorblaettern unter eigengewicht und im stationaeren betrieb" Rept. ISD-243 Stuttgart Univ., Stuttgart, 1979 57 p Original report in GERMAN previously announced as N82-17639 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-269; ISD-243; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

Several rotorblades of a horizontal axis windmill are studied both nonoperating under deadweight, and under quasi-stationary loading with constant forces at rated operation, the blades of which have flap and lead-lag freedom as well as flap-pitch coupling. With a suitable mass distribution it is possible to reduce the blade bending moments in the flap direction drastically. The use of aircraft construction materials is considered. Carbon fiber reinforced plastic is the most suitable. Most of the blade models are investigated without lag hinge. The coning angle of rated operation assumed for the layout is reduced considerably for the blade models with lead-lag freedom in order to obtain sufficient centrifugal stiffness in the lag direction. Author (ESA)

N82-17640# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
STABILITY AND RESPONSE TO GRAVITY OF THE FLAP LAG MOTION FOR A RIGID ROTOR BLADE WITH FLAP-PITCH COUPLING Final Report
J. H. Argyris and B. Kirchgaessner 1980 59 p refs Transl. into ENGLISH of "Stabilitaet und schwerkraftresponse der schlag-schwenkbewegung eines starren rotorblattes mit blattwinkelrueckssteuerung" Rept. ISD-244 Stuttgart Univ., Stuttgart, 1979 80 p Original report in GERMAN announced as N80-30949 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-270; ISD-244; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

The coupled flap lag motion of a single, rigid rotor blade of a wind energy converter with flap and lag hinges and a coupling of the angle of attack with the flap motion is investigated. The equations of motion are developed under the assumption of linearized quasi-stationary aerodynamic forces. Static and dynamic stability of the coupled flap and lag motion are investigated. The equations are integrated for different cases under cyclic gravitational forces in order to estimate the importance of nonlinear terms and of the error resulting from the linearization of the conservative system. The nonlinear terms can be neglected, as can the effects of cyclic stiffness resulting from gravitational force. Results for nonlinearities arising from aerodynamic forces are inconclusive. Author (ESA)

N82-17641# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
DYNAMIC ANALYSIS OF A ROTOR BLADE WITH FLAP AND LAG FREEDOM AND FLAP-PITCH COUPLING Final Report
J. H. Argyris, K. A. Braun, and B. Kirchgaessner 1980 103 p refs Transl. into ENGLISH of "Dyn. anal. eines rotorblattes mit schlagfreiheit, schwenkreiheit u. blattwinkerlueckssteuerung" Rept. ISD-258 Stuttgart Univ., Stuttgart, 1979 95 p Original report in GERMAN previously announced as N80-30950 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-271; ISD-258; ISSN-0170-6071) Avail: NTIS HC A06/MF A01

For a windmill rotor blade, a linearized system of differential equations of motion is developed, using a finite element idealization of linearized quasi-stationary aerodynamic forces. Constant rotational speed and a rigidly supported hub are assumed. For two rotor blade models, which differ only in their stiffness in lag direction, the complex eigenfrequencies are calculated. The dynamic response of the rotor blades is computed for cyclic gravity loads at rated operation, for a gust, and, in one case, for the tower wake. From the deformation of the structure the stresses at selected points along the blade are calculated. Torque and rotor thrust are determined for one model. Additional stiffness improves stability and lead-lag angles. The coning angle is excellently stabilized by the flap-pitch coupling. Author (ESA)

N82-17642# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
STATIC AND DYNAMIC INVESTIGATIONS FOR THE MODEL OF A WIND ROTOR Final Report
J. H. Argyris, K. A. Braun, B. Kirchgaessner, and R. Walther

1980 71 p refs Transl. into ENGLISH of "Statische und dyn. untersuch. and einem windrotormodell" Rept. ISD-259 Stuttgart Univ., Stuttgart, Jun. 1979 69 p Original report in GERMAN previously announced as N81-12626 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-272; ISD-259; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

A wind rotor was constructed in order to test a data acquisition/transfer system which collects experimental data from the operating model and displays it on a screen. The comparison between the experimental data and the model results is used to check the applied computation methods. The static and dynamic analyses of the rotor model are considered. An 11% difference between experimental and model results is shown. A response problem with variable stiffness in time which arose during the dynamic analysis is solved by setting the structural stiffness constant over small time intervals, diagonalizing the time interval considered and integrating. After integration the solutions of the generalized degrees of freedom are transformed back into the physical system, using the time interval eigenvectors.
Author (ESA)

N82-17643# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
LOADING CYCLES AND MATERIAL DATA FOR THE LAYOUT OF A WIND TURBINE OF SPECIAL HUB CONCEPT Final Report
J. H. Argyris and K. A. Braun 1980 38 p refs Transl. into ENGLISH of "Lastwechselzahlen und materialwerte fuer die auslegung einer windturbine spezieller nabenkonstruktion" Rept. ISD-260 Stuttgart Univ., Stuttgart, Jun. 1979 38 p Original report in GERMAN previously announced as N81-12627 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-273; ISD-260; ISSN-0170-6071) Avail: NTIS HC A03/MF A01

The number of loading cycles of a rotor blade was estimated in order to assess allowable blade stress. Fatigue strengths and allowable stresses are calculated for aeronautic construction materials. Using wind data, the number of starts and stops was estimated. With a guess for the number of revolutions necessary to reach stationary operation from standstill, the number of loading cycles was determined, using the blade aerodynamics. The number of operational hours gives the number of loading cycles for rated operation. Rotation speeds of 1.67 and 2 rad/sec are considered. For 1.67, the number of loading cycles during stationary operation = 2.06 x 10 to the 8th power; during starts and cut offs = 357,000. For 2 rad/sec, results are 2.47 x 10 to the 8th power and 463,000. Stress values, expressed in installed power/sqmm, are: aluminum alloy = 98; stainless steel = 294; glass fiber reinforced plastic = 98; and carbon fiber reinforced plastic = 147.
Author (ESA)

N82-17644# World Meteorological Organization, Geneva (Switzerland).
METEOROLOGICAL ASPECTS OF THE UTILIZATION OF SOLAR RADIATION AS AN ENERGY SOURCE, PART 1
1981 311 p refs 2 Vol.
(WMO-557-Vol-1; WMO-TN-172-Vol-1; ISBN-92-63-10557-X) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 50

Meteorological knowledge and activities related to the harnessing of solar energy are treated. The development of the utilization of various forms of energy by human society is reviewed along with WMO activities in support of the rational use of energy, with special regard to solar radiation. Specific actions by which meteorological services can contribute to the utilization of solar energy are pointed out. User requirements for meteorological data are set; how the data is presented and where it can be obtained are shown. Techniques for the measurement of solar radiation, including the calibration of instruments and quality control of data, are discussed while other meteorological parameters required (air temperature, wind speed, humidity, cloud amount, etc.) are also considered. The retrieval of past data, interpolation methods for the estimation of solar radiation, and publishing and archiving data are dealt with.
Author (ESA)

N82-17645# World Meteorological Organization, Geneva (Switzerland).
METEOROLOGICAL ASPECTS OF THE UTILIZATION OF SOLAR RADIATION AS AN ENERGY SOURCE. PART 2: ANNEX, WORLD MAPS OF RELATIVE GLOBAL RADIATION
1981 33 p refs 2 Vol.
(WMO-557-Vol-2; WMO-TN-172-Vol-2) Avail: NTIS MF A01; print copy available at WMO, Geneva, SwFr 50

World maps are presented from which the monthly and annual global radiation can be derived, and an overall picture of the distribution of solar radiation as an energy source can be evolved. The radiation reaching the surface of the Earth in the absence of clouds and the atmosphere was calculated from pure astronomical relationships. Results are given in MJ/sq m by 5 deg of latitude. The establishment of an empirical relationship between satellite brightness data and the relative global radiation (defined as the percentage ratio of actual surface global radiation to the astronomically possible global radiation), using available surface global radiation data as reference values, is suggested.
Author (ESA)

N82-17646# World Meteorological Organization, Geneva (Switzerland).
METEOROLOGICAL ASPECTS OF THE UTILIZATION OF WIND AS AN ENERGY SOURCE
1981 201 p refs
(WMO-575; ISBN-92-63-10575-8; WMO-TN-175) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 40

The application of meteorological data and knowledge to the planning and operation of wind energy conversion systems (WECS) is discussed. The development of WECS and WMO activities related to energy matters, with special regard to wind energy, is reviewed. Atmospheric circulation systems of various scales, atmospheric turbulence, and the boundary layer are considered, including numerical models. Wind energy technology, i.e., the different types of wind machines (both small and large conversion systems) together with their usual possibilities of application, and the environmental impact of WECS, which should be kept in mind in the planning stage in order to reduce it to a minimum, are treated. As to wind energy meteorology, the requirements for, and the availability of, meteorological data for use in the exploratory, planning and operational phases of WECS are determined. The economic aspects of deciding on the establishment of wind energy systems are also indicated. A world map, illustrating the global distribution of wind energy potential is included.
Author (ESA)

N82-17647# Office of Technology Assessment, Washington, D. C.
SOLAR POWER SATELLITES
Aug. 1981 300 p refs
(PB82-108846; OTA-E-144; LC-81-600129) Avail: NTIS HC A13/MF A01 CSCL 10B

The energy potential of the solar power satellite (SPS) was evaluated. The preliminary nature of SPS technology is considered by comparing four alternative SPS systems across a broad range of issues: their technical characteristics, long term energy supply potential, international and military implications, environmental impacts, and institutional effects. The SPS options are also compared to potentially competitive future energy technologies.
GRA

N82-17648# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
DESIGN AND SYSTEM LEVEL PERFORMANCE OF A BATTERY CHARGE REGULATOR FOR SOLAR PHOTOVOLTAIC POWERED AIDS TO NAVIGATION
Walter E. Allen Aug. 1981 52 p Sponsored in part by Coast Guard
(PB82-106824; JHU/APL/CP-083) Avail: NTIS HC A04/MF A01 CSCL 10C

The design characteristics of the battery charge regulator in photovoltaic solar powered aids to navigation are reported and are specifically designed to match the electrical characteristics of the solar array and batteries to be used. The regulator, a series high/low rate type using a FET switch, is examined. GRA

N82-17649 Texas Univ. at Dallas.
THERMAL STRATIFICATION IN STORAGE TANKS Ph.D. Thesis
Mohammad Ali Abdoly 1981 333 p
Avail: Univ. Microfilms Order No. 8126589

The future of solar energy as a commercial source of energy critically depends on cost reduction and/or improvement in the performance of solar systems. Use of a properly designed thermocline storage tank is one factor in reducing overall solar system costs. Thermal stratification of a fluid in storage tank is a natural process that takes place due to the decreased density of the fluid at higher temperature. This natural process creates a transition zone temperature gradient between cold and hot fluid zones, called the thermocline. The percentage of recoverable heat (PHR), and thickness of the thermocline (d) are defined and theoretical relationships are found between PHR, d and different design parameters such as length of tank, radius of tank, insulation thickness, time, and initial temperature difference between cold and hot water. Dissert. Abstr.

N82-17650 Colorado State Univ., Fort Collins.
DEVELOPMENT OF ION BEAM SPUTTERED ITO/ POLYSILICON SOLAR CELL TECHNOLOGY Ph.D. Thesis
Alan Paul Genis 1981 264 p
Avail: Univ. Microfilms Order No. 8126429

Indium Tin Oxide (ITO) was successfully used in place of a metal for solar cells of the conductor insulator semiconductor (CIS) type. An evaluative study to determine whether efficient and stable ITO based solar cells could be fabricated reproducibly with large area on polycrystalline silicon substrates was performed. The development of fabrication techniques and supporting analytical studies used are described. Ion beam sputtering technology was used to fabricate the cells. It was necessary to develop sputter deposition fixturing, optimize temperature, pressure and operation time parameters and incorporate hydrogen in the sputtering gas. The more efficient solar cells apparently consist of an induced n-on-p junction in the silicon. Poorer cells with smaller barriers likely resemble Schottky barriers in that the metalurgical and electronic junctions coincide. Various electrical and optical characterizations of initially inefficient devices were used to optimize cell fabrication procedures. ITO/ polycrystalline silicon solar cells were fabricated on a wide variety of substrates. Results of the study are presented. Dissert. Abstr.

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-17651 North Carolina Univ. at Chapel Hill.
SULFUR BALANCE IN OUTDOOR SMOG CHAMBERS AND RESULTING IMPLICATIONS FOR SULFUR DIOXIDE PHOTOOXIDATION STUDIES Ph.D. Thesis
Janet Stickney Meyer 1981 208 p
Avail: Univ. Microfilms Order No. 8125602

To determine the causes of SO2 disappearance in a smog chamber, sulfur balances in inert and in photochemically oxidizing atmospheres were investigated. Teflon bag, sulfur deposited on surfaces is measured using a radioactive tracer technique. Analysis of SO2 behavior in the chamber indicates that SO2 concentrations decrease due to three factors. First dilution due to sampling decreases SO2 concentrations at a rate of 1 to 3%/hr. Second, uptake of SO2 by water films and metal surfaces removes SO2 at a rate of 0 to 9%/hr, depending on surface conditions. Third, deposition on surfaces apparently increases by 10%/hr or more, in photochemically oxidizing atmospheres. The increased deposition appears to be due to heterogeneous oxidation of SO2 by nitrogen oxides. The findings of the chamber studies suggest the presence of wet surfaces which encourage the hypothesized heterogeneous reactions significantly influence the behavior of SO2 in photochemically oxidizing atmospheres. Dissert. Abstr.

N82-17652# South Dakota State Univ., Brookings.
INFILTRATION LAND TREATMENT OF STABILIZATION POND EFFLUENT Final Report, 15 Jun. 1975 - 17 Jun. 1979
James N. Dornbush Sep. 1981 57 p refs
(Grant EPA-R-803804)
(PB82-109919; EPA-600/2-81-226) Avail: NTIS HC A04/MF A01 CSCL 13B

A pilot rapid infiltration wastewater treatment system consisting of three 0.07 hectare basins was operated for four seasons at Brookings, South Dakota. The objectives of the study were to demonstrate the rapid infiltration land treatment could upgrade stabilization pond effluent to meet stringent effluent requirements and to identify winter operating constraints for the system. After passing through 1.3 m of the soil profile, the following quality was observed: BOD5 was less than 4 mg/l all of the time and generally less than 2 mg/1; suspended solids rarely exceeded 4 mg/1; total phosphorus rarely exceeded 1 mg/1; ammoniacal nitrogen was less than 2 mg/1 and usually less than 1.1 mg/1; and nitrate nitrogen rarely exceeded 10 mg/1. Winter operation of the pilot units with intermittent applications was not practical. GRA

N82-17653*# Kearney State Coll., Nebr. Dept. of Physics and Physical Science.
A COMPARISON OF IN-CLOUD HCl CONCENTRATIONS FROM THE NASA/MSFC MDM TO MEASUREMENTS FOR THE SPACE SHUTTLE LAUNCH Final Technical Report
Marvin E. Glasser 12 Apr. 1981 42 p refs
(Contract NAS9-16162)
(NASA-CR-167497) Avail: NTIS HC A03/MF A01 CSCL 13B

The Multilevel Diffusion Model (MDM) Version 5 was modified to include features of more recent versions. The MDM was used to predict in-cloud HCl concentrations for the April 12 launch of the space Shuttle (STS-1). The maximum centerline predictions were compared with measurements of maximum gaseous HCl obtained from aircraft passes through two segments of the fragmented shuttle ground cloud. The model over-predicted the maximum values for gaseous HCl in the lower cloud segment and portrayed the same rate of decay with time as the observed values. However, the decay with time of HCl maximum predicted by the MDM was more rapid than the observed decay for the higher cloud segment, causing the model to under-predict concentrations which were measured late in the life of the cloud. The causes of the tendency for the MDM to be conservative in over-estimating the HCl concentrations in the one case while tending to under-predict concentrations in the other case are discussed. Author

N82-17654*# Old Dominion Univ., Norfolk, Va. Dept. of Economics.
ENERGY ENVIRONMENT STUDY Final Report, 16 May 1980 - 15 Mar. 1981
Raymond Strangways Dec. 1981 123 p refs
(Contract NAG1-66)
(NASA-CR-168458) Avail: NTIS HC A06/MF A01 CSCL 13B

The international demand for and supply of oil between the years 1980 and 2000 is assessed and future world oil prices and their implications for the price of jet fuel are estimated. Three critical questions are investigated: (1) how long will the world supply of oil continue to keep pace with its demand under likely trends in its use and discovery; (2) at what price will demand and supply clear the world oil market; (3) what does the analysis imply about the price of jet fuel. Projection of oil price is based upon supply and demand, which is consistent with microeconomic analysis. E.A.K.

N82-17655# Committee on Commerce, Science, and Transportation (U. S. Senate).
NOISE IMPACT ON COMMUNITIES FROM AIRCRAFT
Washington GPO 1981 40 p Hearing before the Comm. on Com., Sci., and Transportation, 97th Congr., 1st Sess., 10 Feb. 1981
(GPO-80-617) Avail: Committee on Commerce, Science, and Transportation

The environmental and noise pollution problems of Cannon International Airport in Reno, Nevada are discussed. Restrictions imposed by the Federal government and the airport management on flight into and out of the airport were reviewed. Near-by urban development projects are described and the impact of

airport traffic on them was evaluated. Discussion focused on the balance of economic development brought about by the airport and the rights of residents to enjoy a comfortable environment. T.M.

N82-17656# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

PIXE AND ITS APPLICATION TO THE ELEMENT ANALYSIS OF MILAN AIR PARTICULATE MATTER

E. Caruso, G. M. Marcazzan, and P. Redaelli 1981 20 p refs Presented at 5th Intern. Conf. on Anal. Chem., Lancaster, United Kingdom, 20-26 Jul. 1980 Sponsored by Ente Nazionale per l'Energia Elettrica - Direzione Studi e Ricerche

(CISE-1685) Avail: NTIS HC A03/MF A01

The features of the Particle Induced X-ray Emission (PIXE) system using the proton beam of the tandem Van de Graaff accelerator are described. The system was calibrated for quantitative analyses, its reliability was verified, and its advantages were compared with other techniques. The main advantage of the PIXE system is shown to be in the analysis of microquantities of matter. The system was used in the study of the atmospheric aerosol of Milan. Average element concentrations and their daily and seasonal variations are given along with particle size distributions. J.M.S.

N82-17657# MSA Research Corp., Evans City, Pa. Div. of Mine Safety Appliances Co.

MODIFICATION OF SPILL FACTORS AFFECTING AIR POLLUTION. VOLUME 1: AN EVALUATION OF COOLING AS A VAPOR MITIGATION PROCEDURE FOR SPILLED VOLATILE CHEMICALS Final Report, Sep. 1978 - Dec. 1980

J. S. Greer, S. S. Gross, R. H. Hiltz, and M. J. McGoff Sep. 1981 86 p refs 2 Vol.

(Contract EPA-68-03-2648)

(PB82-108382; Rept-80-197-Vol-1; EPA-600/2-81-214) Avail: NTIS HC A05/MF A01 CSCL 13B

Spilled chemicals that pose a hazard to the land and water ecosystems can also provide a significant vapor hazard. Although the vapors released by such chemicals may ultimately be dispersed in the environment with little long-term effects, they do pose a hazard to life and property downwind of the spill. Among the vapor amelioration techniques that were considered is the use of a coolant to lower the temperature of a spill and reduce its equilibrium vapor pressure. GRA

N82-17658# MSA Research Corp., Evans City, Pa. Div. of Mine Safety Appliances Co.

MODIFICATION OF SPILL FACTORS AFFECTING AIR POLLUTION. VOLUME 2: THE CONTROL OF THE VAPOR HAZARD FROM SPILLS OF LIQUID ROCKET FUELS Final Report, Jan. - Dec. 1980

J. S. Greer, S. S. Gross, R. H. Hiltz, and M. J. McGoff Sep. 1981 30 p 2 Vol.

(Contract EPA-68-03-2648)

(PB82-108390; Rept-80-197-Vol-2; EPA-600/2-81-215) Avail: NTIS HC A03/MF A01 CSCL 13B

Coolants exhibited some control over vapor release from the hypergolic fuels. Liquid nitrogen was the most effective material. Logistics were deemed a major disadvantage for the anticipated spill scenarios. Foams using commercial agents were beneficial with hydrazine but were not effective against nitrogen tetroxide. Modified foam systems incorporating acrylic resins were more effective. They were able to maintain hydrazine concentrations at or below 0.5 ppm. Some control was also exhibited with nitrogen tetroxide, but there was intermittent vapor release through the foam. Based upon the work of this program, the acrylic foams offer a promising approach to the control of the vapor hazard from hydrazine and nitrogen tetroxide. GRA

N82-17659# Culp/Westner/Culp Clean Water Consultants, Cameron Park, Calif.

GRANULAR ACTIVATED CARBON INSTALLATIONS Final Report

Russell L. Culp, Justine A. Faisst, and Clinton E. Smith (Rubel and Hager, Inc., Tucson, Ariz.) Sep. 1981 296 p refs

(Contract EPA-68-03-2516; CI-76-0288)

(PB82-102492; EPA-600/2-81-177) Avail: NTIS HC A13/MF A01 CSCL 13B

Design criteria, performance data, and cost information were compiled and summarized from twenty-two operating granular activated carbon (GAC) installations. These plants produce municipal water for drinking, treat municipal and industrial wastewaters, and process food and beverage products. Guidance is provided in estimating the cost of GAC treatment for public water supplies. Intended for use in connection with a previous series of EPA reports on 'Estimating Water Treatment Costs' to obtain project specific cost estimates, this manual describes how to obtain design criteria for water systems. GRA

N82-17660# Kerr (Robert S.) Environmental Research Lab., Ada, Okla.

MANUAL OF GROUND-WATER QUALITY SAMPLING PROCEDURES

Marion R. Scalf, James F. McNabb, William J. Dunlap, Roger L. Cosby, and John S. Fryberger (Engineering Enterprises, Inc., Norman, Okla.) Sep. 1981 105 p refs

(PB82-103045; EPA-600/2-81-160) Avail: NTIS HC A06/MF A01 CSCL 13B

Recent environmental legislation has recognized the importance of ground water quality protection and the stresses that man's activities, especially waste disposal, place on this vital national resource. To provide a realistic assessment of current and potential pollution problems and a rational basis for ground water quality protection, it is necessary to collect representative samples from this remote and relativity inaccessible environment. Some procedures currently utilized to sample ground water and subsurface earth materials for microbial and inorganic and organic chemical parameters are reported. GRA

N82-17661# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.

REMOVING WATER-SOLUBLE HAZARDOUS MATERIAL SPILLS FROM WATERWAYS WITH CARBON Final Report, Jun. 1978 - Jan. 1979

George R. Schneider Sep. 1981 67 p refs

(Contract EPA-68-03-2648)

(PB82-103813; EPA-600/2-81-195) Avail: NTIS HC A04/MF A01 CSCL 13B

The removal of water soluble organic materials from water by carbon filled, buoyant packets and panels is described. Equations are derived for the removal of dissolved organic compounds from waterways by buoyant packets that are either cycled through a water column, or suspended in the waterway by natural turbulence, and by panels mechanically suspended in waterways. The effects of turbulence on the suspension of buoyant packets and of turbulent mixing and longitudinal dispersion of spills in waterways on the removal of water-soluble hazardous materials, are considered. GRA

N82-17662# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.

INVESTIGATION OF PETROLEUM IN THE MARINE ENVIRONS OF THE STRAIT OF JUAN DE FUCA AND NORTHERN PUGET SOUND, PART 2 (SECOND-YEAR CONTINUATION)

Donald W. Brown, Andrew J. Friedman, Patty G. Prohaska, and William D. MacLeod, Jr. Apr. 1981 46 p refs

(PB82-104290; NOAA-TM-OMPA-7; NOAA-81072001) Avail: NTIS HC A03/MF A01 CSCL 13B

Existing levels of petroleum hydrocarbons in the Strait of Juan de Fuca and Northern Puget Sound were measured. Spatial and temporal trends in occurrence, concentration, and composition of petroleum-related hydrocarbons were investigated. Although the sites were relatively free from petroleum contamination, hydrocarbons indicative of petroleum were found. It is concluded that hydrocarbon concentrations in intertidal sediment and mussels can be used to monitor for spilled oil in this region. GRA

N82-17663# Illinois State Geological Survey, Urbana.

ATTENUATION OF POLYBROMINATED BIPHENYLS AND HEXACHLOROBENZENE BY EARTH MATERIALS Final Report

R. A. Griffin and S. F. J. Chou Sep. 1981 60 p refs

(Grant EPA-R-804684)

(PB82-107558; EPA-600/2-81-191) Avail: NTIS HC A04/MF A01 CSCL 13B

The aqueous solubility, adsorption, mobility, and microbial degradation of polybrominate biphenyls (PBBs) and hexachlorobenzene (HCB) were studied. It is indicated that PBBs were more than 200 times, and HCB more than 2.5 times soluble in landfill leachate than in distilled water. Also, the solubilities of PBBs and HCB were higher in creekwater and landfill leachates than in purified waters. HCB showed a greater tendency for adsorption than PBBs. The PBBs and HCB were strongly adsorbed by the Ambersorb XE-348, but not by organic solvents. The PBBs and HCB remained immobile when leached with water or landfill leachate but were highly mobile when leached with organic solvents. It is found that PBBs and HCB are resistant to microbial degradation. GRA

N82-17664# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.

ASSESSMENT OF OIL PRODUCTION VOLATILE ORGANIC COMPOUND SOURCES Final Report, Jan. - Sep. 1980

W. S. Eaton, G. R. Schneider, W. Unterberg, and F. G. Bush, III Sep. 1981 75 p

(Contract EPA-68-03-2648)

(PB82-108176; EPA-600/2-81-197) Avail: NTIS HC A04/MF A01 CSCL 13B

Oil and gas exploration and production drilling technology are described with emphasis on the makeup, use, and disposal of drilling fluids. A model for assessment of volatile organic compounds (VOC) emissions accompanying drilling is presented, along with an estimation of the potential VOC emissions associated with drilling activities. Emissions of volatile organic compounds from oil production in new fields were estimated, based on three types of information: (1) extent of new oil and gas fields (those that started production after 1974) in the contiguous 48 states; (2) drilling techniques used for oil and gas exploration and production wells (and their VOC potential), with specific emphasis on the drilling fluids; and (3) equipment and techniques for oil and gas production in new fields and their potential VOC sources. GRA

N82-17665# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.

A HAZARDOUS MATERIALS SPILL WARNING SYSTEM Final Report, Jun. 1974 - Dec. 1978

Milton Kirsch, Robert Melvold, and John Vrolyk Sep. 1981 69 p refs

(Contract EPA-68-03-2080)

(PB82-108424; RI/RD77-263; EPA-600/2-81-212) Avail: NTIS HC A04/MF A01 CSCL 13B

A list of materials defined as hazardous substances based on their aquatic toxicity was developed and certain materials have been designated as priority pollutants. The spill alarm system detects the presence of hazardous toxic materials in streams and rivers. It consists of nonselective detection components which together serve to detect all the materials on the designated hazardous materials list, and the priority pollutants. GRA

N82-17666# TRW Environmental Services, Redondo Beach, Calif.

FEASIBILITY OF COMMERCIALIZED WATER TREATMENT TECHNIQUES FOR CONCENTRATED WASTE SPILLS Final Report

Masood Ghassemi, Kar Yu, and Sandra Quinlivan Sep. 1981 125 p refs

(Contract EPA-68-03-2560)

(PB82-108440; EPA-600/2-81-213) Avail: NTIS HC A06/MF A01 CSCL 13B

The suitability and economics of using reverse osmosis, ultrafiltration, ion exchange, wet air oxidation, high purity oxygen activated sludge process, ultraviolet ozone oxidation, and coagulation/precipitation for onsite treatment of concentrated wastes were evaluated. When used alone, none of the processes considered would be economically applicable to on-site mobile unit treatment of the variety of concentrated wastes encountered, although reverse osmosis, ion exchange, and wet air oxidation meet many of the application requirements and hence require less pretreatment and/or post-treatment. The estimated capital costs for a unit suitable for trailer mounting vary from as low as $35,000 for a 227,000 liters/day (60,000 gpd) ultrafiltration unit to as high as $1.25 to $1.5 million for a 54,000 liters/day (14,400 gpd) 2-trailer wet air oxidation unit. Author (GRA

N82-17667# Mason and Hanger-Silas Mason Co., Inc., Leonardo, N. J.

USE OF SELECTED SORBENTS AND AN AQUEOUS FILM FORMING FOAM ON FLOATING HAZARDOUS MATERIALS Final Report, 2-13 May 1977

Michael K. Breslin and Michael D. Royer Sep. 1981 58 p

(Contract EPA-68-03-0490)

(PB82-108895; EPA-600/2-81-211) Avail: NTIS HC A04/MF A01 CSCL 13B

The effect of sorbent materials and fire fighting foam on containment, recovery and vapor suppression of floatable hazardous materials (HM) spilled on water were determined. The devices used in both programs were the clean water incorporated harbour boom and the industrial and municipal engineering swiss OELA III skimmer. Dioctyl phthalate (DOP), octanol, and naphtha served as the hazardous materials. The sorbent materials were polyurethane foam cubes, Sorbent C and Imbiber Beads. An aqueous film forming foam (AFFF), FC-206, was used as the fire fighting foam. The type of HM, Sorbent, tow speed, and wave condition served as controlled and independent variables. Critical tow speed of the boom, HM vapor concentration, and fluid recovered by the skimmer were the dependent variables. GRA

N82-17668# Mason and Hanger-Silas Mason Co., Inc., Leonardo, N. J.

PERFORMANCE TESTING OF THE DIPERNA SWEEPER Final Report

Michael K. Breslin Sep. 1981 44 p

(Contract EPA-68-03-2642)

(PB82-109174; EPA-600/2-81-229) Avail: NTIS HC A03/MF A01 CSCL 13B

Forty-three oil recovery tests were run. A range of best performance for an oil skimmer under various environmental conditions in light and heavy oils was established. The DiPerna Sweeper is a self-contained, floating oil skimmer that can operate in either a stationary or advancing mode. Its principle of operation is based upon drawing oil and water into a sealed container by creating a slight vacuum in the container. A floating weir serves as the inlet. The partial vacuum is created by pumping fluid from the sealed container. The container serves as an oil/water separator. Separate pumps draw water from the bottom of the vessel while others draw oil from the top. The device was able to recover over 75% of the oil presented to it in calm water at tow speed up to two knots. GRA

N82-17669# TRW, Inc., Research Triangle Park, N.C. Environmental Engineering Div.

PERFORMANCE EVALUATION OF AN INDUSTRIAL SPRAY DRYER FOR SO2 CONTROL Final Report, Mar. 1980 - Jun. 1981

James A. Kezerle, Steve W. Mulligan, Dave-Paul Dayton, and Patricia J. Perry Aug. 1981 274 p refs Prepared in cooperation with Celanese Fibers Company, Cumberland, Md. and Rockwell International, Downey, Calif., and Wheelabrator-Frye, Inc., Pittsburgh, Pa.

(Contract EPA-68-02-3174)

(PB82-110701; EPA-600/7-81-143) Avail: NTIS HC A12/MF A01 CSCL 13B

Results of a test to evaluate the SO2 removal performance of the lime-spray-dryer/fabric-filter system treating flue gas from the stoker-coal-fired boiler are presented. Continuous monitors were used to collect data according to EPA procedures for compliance testing. Data were collected for 23 days with the boiler operating at about half load. In addition to evaluating SO2 removal by dry flue gas desulfurization, operating experience with the boiler and spray-dryer/baghouse system was obtained for 5 months. Data were reduced to express SO2 removal on a mass per unit energy input basis as prescribed by EPA. Test results showed the mean SO2 removal efficiency to be 70% (standard deviation of + or - 9%) when the sulfur content of the bituminous coal averaged 2%. T.M.

N82-17670# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.
GUIDE FOR SPILL PREVENTION CONTROL AND COUNTERMEASURE INSPECTORS Final Report, 20 Apr. 1978 - 31 Jul. 1979
Walter Unterberg and Robert M. Moorehead Oct. 1981 119 p refs
(Contract EPA-68-2648)
(PB82-115296; EPA-600/2-81-239) Avail: NTIS HC A06/MF A01 CSCL 13B

Implementation of the Oil Pollution Prevention Regulations promulgated in 40CFR112 for nontransportation related onshore and offshore facilities are reported. The SPCC regulations, the role of the SPCC inspector, the affected facilities, and procedures for carrying out the inspection are reported. Forms for use by the inspector in the field and for documentation are indicated. The use of these forms provide nationwide uniformity in SPCC reporting. GRA

N82-17671# Environmental Design and Planning, Inc., Boston, Mass.
EVALUATION OF A TREATMENT LAGOON FOR COMBINED SEVER OVERFLOW Final Report, Jul. 1979 - Oct. 1980
Daniel J. Connick, William C. Pisano, and Gerald L. Aronson Sep. 1981 117 p refs
(PB82-105214; EPA-600/2-81-196) Avail: NTIS HC A06/MF A01 CSCL 13B

The effectiveness of a 143 MG facultative lagoon for treating combined sewer overflow and polishing secondary wastewater treatment plant effluent was assessed. The lagoon performance was evaluated for changes in the degree of aeration. This parameter has the dual function of mixing the lagoon and increasing the oxygen levels above that provided by natural reaeration. The pollutant removal performance of the lagoon was evaluated for different discharge levels/detention periods. The effects of the stormwater loadings on lagoon performance were assessed so as to determine the buffering capacity of the lagoon for treating volumes of highly polluted intermittent flow. A full scale 18 MGD application of state of the art disinfection technology was utilized for bacterial reduction. GRA

N82-17672# Louisville Gas and Electric Co., Ky.
PILOT FIELD STUDIES OF FGD WASTE DISPOSAL AT LOUISVILLE GAS AND ELECTRIC Final Report, May 1976 - Aug. 1979
R. P. VanNess, A. L. Plumley (Combustion Engineering, Inc., Windsor, Conn.), N. C. Mohn (Combustion Engineering, Inc., Windsor, Conn.), C. R. Ulrich (Louisville Univ., Kentucky), and D. J. Hagerty (Louisville Univ., Kentucky) 1981 314 p refs
(Contract EPA-68-02-2143)
(PB82-105479; EPA-600/7-81-155) Avail: NTIS HC A14/MF A01 CSCL 13B

The gas desulfurization (FGD) waste disposal was studied. It is shown that properly prepared landfill from FGD sludge/fly ash mixtures prevents trace element contamination of underlying groundwater. Small synthetically lined, above ground impoundments has higher concentrations of trace contaminants than subsurface impoundments. Most sites developed compressive strengths greater than the minimum required for recreational or light structural landfill. Water samples from beneath larger subsurface impoundments indicated that the filtering action of soil aids in decreasing the concentration of contaminants reaching the ground water supply. Certain mixtures under fixation reaction, reducing the permeability and minimizing the release of moisture and/or contaminants to the surrounding soil. GRA

N82-17673# Association of Metropolitan Sewerage Agencies, Washington, D.C.
SURVEY AND EVALUATION OF FINE BUBBLE DOME DIFFUSER AERATION EQUIPMENT Final Report, 1 Aug. 1979 - 15 Sep. 1980
Daniel H. Houck and Arthur G. Boon (British Water Research Centre, Stevenage, England) Sep. 1981 189 p refs
(Grant EPA-R-806990)
(PB82-105578; EPA-600/2-81-222) Avail: NTIS HC A09/MF A01 CSCL 13B

The oxgyen transfer performance, operation and maintenance (O&M) requirements, and proper design approaches for fine bubble dome diffuser aeration systems used in activated sludge wastewater treatment were examined. Wastewater treatment plants with dome diffuser aeration equipment were surveyed. Influent and effluent wastewater characteristics, power demand, air supply, and process parameters were compiled for a 5 yr period. It is indicated that, relative to other devices, fine bubble dome diffuser systems perform at high energy efficiency when proper design, operation, and maintenance practices are followed and when strong alpha depressing industrial wastes are absent. The O&M experience with this equipment has generally been very good, with 6-10 yrs or longer, between cleaning. Oxygen transfer performance is highly variable between the plants. GRA

N82-17674# Rockwell International Corp., Newbury Park, Calif. Environmental Monitoring and Services Center.
DETECTION AND MAPPING OF INSOLUBLE SINKING POLLUTANTS Final Report, Jun. 1978 - Oct. 1980
Raymond A. Meyer, Milton Kirsch, and Larry F. Marx Sep. 1981 92 p refs
(Contract EPA-68-03-2648)
(PB82-105586; EPA-600/2-81-198) Avail: NTIS HC A05/MF A01 CSCL 13B

A continuous submersible monitor using a cyclically purged electrical conductivity probe capable of long term deployment even when buried in sand or silt was conceived, designed, and tested. The submersible unit, which is battery powered and has no connection to the shore based receiver, transmits the conductivity data via ultrasonic transmission. Laboratory tests show that a 200 kHz depth finder system can resolve the echoes from the surface of a 1 cm-deep layer of carbon tetrachloride (CCl4) from those returning from a hard, sandy or muddy bottom. Field tests indicate that few precursors to the bottom echo return are present that might mask or interfere with the detection of an echo from a pollutant pool. Return echoes were evaluated by 16 mm motion picture photography. A computer based comparator counter technique was developed for data management. GRA

N82-17675# Sanitation District No. 1 of Campbell and Kenton Counties, Covington, Ky.
DEMONSTRATION PHYSICAL CHEMICAL SEWAGE TREATMENT PLANT UTILIZING BIOLOGICAL NITRIFICATION Final Report, Jun. 1973 - Dec. 1978
E. Brenton Henson Sep. 1981 88 p refs
(Grant EPA-S-802719)
(PB82-101643; EPA-600/2-81-173) Avail: NTIS HC A05/MF A01 CSCL 13B

The feasibility of treating sewage with a physical chemical type of wastewater treatment plant with a biological process for nitrification was demonstrated. The system has unit processes consisting of screening, flow equalization, chemical clarification using lime, biological nitrification, filtration, and activated carbon adsorbtion. Phosphorous levels were reduced by more than 80% during the chemical clarification step. Total nitrogen concentration was reduced by up to one third during the treatment. Effluent BOD5 and suspended solids levels were significantly lower for this process than the average values obtained from seven various types of biological treatment plants. GRA

N82-17676# Environmental Resources Management, Inc., West Chester, Pa.
PRODUCTION ENGINEERING AND MARKETING ANALYSIS OF THE ROTATING DISK EVAPORATOR Final Report, Sep. 1978 - May 1979
Phillip L. Buckingham Sep. 1981 52 p refs
(Contract EPA-68-02-2738)
(PB82-101676; EPA-600/2-81-179) Avail: NTIS HC A04/MF A01 CSCL 13B

Mechanical evaporation of wastewater from single family homes by rotating disk evaporator (RDE) and functions in a nondischarging mode was analyzed. The device has potential use where site limitations preclude conventional methods of onsite disposal. The marketing analysis defined the market potential for RDE systems, developed a practical design, estimated production and installation costs, and refined market estimates based on cost comparisons. GRA

N82-17677# Engineering-Science, Inc., Durham, N.C.
EXAMPLE EMISSION INVENTORY DOCUMENTATION FOR 1982 OZONE STATE IMPLEMENTATION PLANS (SIPS)
Mar. 1981 148 p refs Prepared in cooperation with Peat, Marwick, Mitchell, and Co., Washington, D.C.
(Contracts EPA-68-02-3506; EPA-68-02-3509)
(PB82-101908; EPA-450/4-80-033) Avail: NTIS HC A07/MF A01 CSCL 13B

Example documentation showing the items and format required as part of the VOC/NOx emission inventory submittals for the 1982 ozone state implementation plans (SIPs) is reported. The EPA summary reporting tables are exemplified. Documentation on point, area, and highway vehicle sources is included. GRA

N82-17678# Illinois Univ. at Urbana-Champaign.
POTENTIAL WATER QUANTITY AND WATER QUALITY IMPACTS OF POWER PLANT DEVELOPMENT SCENARIOS ON MAJOR RIVERS IN THE OHIO BASIN
E. Downey Brill, Jr., Shoou-Yuh Chang, Robert W. Fuessle, and Randolph M. Lyon Apr. 1981 225 p refs
(Grant EPA-R-805588)
(PB82-102401; EPA-600/7-81-045) Avail: NTIS HC A10/MF A01 CSCL 13B

Water consumption levels associated with power plant cooling were estimated for different energy development scenarios for the Ohio River Basin potential impacts of power plant consumption and pollutant emissions on ambient water quality were also estimated. Cumulative water consumption was compared to the 7 day 10 year low flow values for various locations along the tributaries and main stem of the Ohio River. The total potential consumption associated with projected municipal and non power industrial was evaluated. Potential water quality impacts were estimated. Potential impacts on water quality result mainly from plant consumption are generally small in comparison to background levels. GRA

N82-17679# Delaware River Basin Commission, Trenton, N.J.
THE DELAWARE RIVER BASIN COMPREHENSIVE (LEVEL B) STUDY Final Environmental Impact Statement
May 1981 161 p refs Prepared for Water Resources Council, Washington, D.C.
(PB82-111477) Avail: NTIS HC A08/MF A01 CSCL 13B

Water resource problems were identified. Policies, programs, and projects are considered that encompass water conservation, water quality, water supply, flow maintenance, flood loss reduction, fish, wildlife and recreation, energy, and navigation. The roles of the Commission, the federal, state, and local governments, and the private sector in implementing the Level-B Preferred Plan are addressed. GRA

N82-17680# Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
EXTENSION OF THE SOIL CONSERVATION SERVICE RAINFALL-RUNOFF METHODOLOGY FOR UNGAGED WATERSHEDS Final Report
Hubert J. Morel-Seytoux and James P. Verdin Jul. 1981 82 p refs
(Contract DOT-FH-PO-93-0015)
(PB82-111394; FHWA/RD-81/060) Avail: NTIS HC A05/MF A01 CSCL 13B

An extension of the method employing modern physically based infiltration equations is presented. Runoff estimates are based upon the soil types and land use practices occurring within a watershed. The table permits the estimation of direct runoff by physical infiltration equations for any ungaged watershed for which a curve number may be determined by knowledge of soil types and land use. GRA

N82-17681# Tetra Tech, Inc., Lafayette, Calif.
IMPACT OF CANADIAN POWER PLANT DEVELOPMENT AND FLOW APPORTIONMENT ON THE POPLAR RIVER BASIN Final Environmental Impact Statement
Jun. 1981 392 p refs
(Contract EPA-68-01-4873)
(PB82-111618; TETRAT-TC-3254; EPA-908/5-81-003) Avail: NTIS HC A17/MF A01 CSCL 13B

A 300 megawatt coal-fired power plant was constructed by Saskatchewan Power Corporation on the East Fork of the Poplar River about 4 miles north of the International Boundary, another 300 megawatt unit is under construction. The power plant and associated reservoir will result in a water use and will modify the transboundary flow of the Poplar River. The impacts of several flow apportionment alternatives are addressed in addition to other potential impacts of the power plant on the U.S. part of the Poplar River Basin. The Poplar River flows will be reduced under conditions of the recommended apportionment. These reduced flows result in less water available for irrigation expansion. GRA

N82-17682# Great Lakes Basin Commission, Ann Arbor, Mich.
GREAT LAKES ENVIRONMENTAL PLANNING STUDY Summary Report
Sep. 1981 25 p Sponsored by Water Resources Council
(PB82-112970) Avail: NTIS HC A02/MF A01 CSCL 13B

Valuable products of the study include: an inventory of present and anticipated mathematical modeling tools; an overview of how these models can be useful to managers; a Great Lakes nearshore water quality index; and environmental quality maps for the Great Lakes basin. More importantly, the study provided insights that will assist more effective management of the lakes in the future. GRA

N82-17683# GCA Corp., Bedford, Mass. Technology Div.
CONTROL OF PARTICULATE EMISSIONS FROM ATMOSPHERIC FLUIDIZED-BED COMBUSTION WITH FABRIC FILTERS AND ELECTROSTATIC PRECIPITATORS Final Report, Dec. 1979 - Dec. 1980
D. V. Bubenick, Robert R. Hall, and John A. Dirgo Jun. 1981 77 p refs
(Contract EPA-68-02-2693)
(PB82-115528; EPA-600/7-81-105) Avail: NTIS HC A05/MF A01 CSCL 13B

Results of a study of chemical and physical characteristics affecting the performance of particulate control equipment, based on five fly ash samples from full- and pilot-scale atmospheric fluidized-bed combustion (AFBC) units are reported. Analysis of acquired data by fabric filter (FF) and electrostatic precipitator (ESP) mathematical models illustrates how control device performance may be affected by AFBC fly ash properties.M.D.K.

N82-17684# Tennessee Valley Authority, Muscle Shoals, Ala. Div. of Energy Demonstrations and Technology.
DEFINITIVE SOx CONTROL PROCESS EVALUATIONS: AQUEOUS CARBONATE AND WELLMAN-LORD (ACID, ALLIED CHEMICAL, AND RESOX) FGD (FLUE GAS DESULFURIZATION) TECHNOLOGIES Final Report, Apr. 1978 - Apr. 1981
J. R. Byrd, K. D. Anderson, S. V. Tomlinson, and R. L. Torstrick Jun. 1981 319 p refs
(Contract EPA-IAG-D9-3721-81)
(PB82-118670; EPA-600/7-81-099; EDT-121) Avail: NTIS HC A14/MF A01 CSCL 13B

Economic evaluations of two processes: (1) the aqueous carbonate process (ACP) and the Wellman-Lord process, applied to a sulfuric acid plant, (2) the Resox process, and the coal reduction process, all for sulfur production are reported. The ACP uses a spray dryer flue gas desulfurization (FGD) system and molten salt reduction with coal to make sulfur. The ACP has a major cost advantage because it incorporates final fly ash and chloride removal as process functions. The ACP has a major advantage in annual revenue requirements because it does not need process or reheat steam. Wellman-Lord process costs are the same for all three applications. GRA

N82-17685# New York Sea Grant Inst., Albany.
SEA GRANT MARITIME HERITAGE SERIES: THE BIGHT OF THE BIG APPLE
Donald F. Squires 1981 93 p refs Prepared for NOAA
(PB82-119439; NYSG-RS-81-00; NOAA-81082003) Avail: NTIS HC A05/MF A01 CSCL 13B

The history of the New York Bight harbors and the relationship between man and the ocean is described. The growth and development of the region has revolved around ocean resources and waterborne transport for nearly four centuries; a consequential segment of the economy is still based upon the resources of the ocean and the transport the ocean makes possible. The Bight has often been neglected resulting in enormous negative

impact upon the coastal ocean. There are opportunities to rebuild the heritage, to once again enjoy those aspects of the coastal ocean that shaped the development of the region, to undo some damage that has been done. GRA

N82-17686# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.
THE POTENTIAL ATMOSPHERIC IMPACT OF CHEMICALS RELEASED TO THE ENVIRONMENT: PROCEEDINGS OF FOUR WORKSHOPS
John M. Miller, ed. Jan. 1981 240 p refs Workshop held at Jekyll Island, Ga., Nov. 1979; Workshop held at Boulder, Colo., Nov. 1979; Workshop held at Boulder, Colo., Sep. 1979; Workshop held at Boulder, Colo., Sep. 1979
(Contract EPA-IAG-98120-AOTE)
(PB82-119447; EPA-560/5-80-001) Avail: NTIS HC A11/MF A01 CSCL 13B

The impact of toxic chemicals on the abiotic environment (specifically, the atmosphere), to the feasibility of screening chemicals for these impacts are assessed and whenever possible to develop a screening logic were assessed. Four workshops are reported: (1) toxic substances in atmospheric deposition; (2) screening chemicals for inadvertent modification of the stratosphere; (3) the impact of chemicals on the radiative transfer imbalance; and (4) the impact of anthropogenic chemicals on precipitation processes. GRA

N82-17687# Institute of Gas Technology, Chicago, Ill.
MULTI-FUEL LOW-NOx BURNER DEVELOPMENT, PHASE 2 Annual Report, Jan. - Dec. 1980
Hamid A. Abbasi, Mark J. Khinkis, and Richard T. Waibel Jan. 1981 46 p Sponsored in part by Bloom Engineerings, Hauck Manufacturing and Eclipse, Inc.
(Contract GRI-5014-342-0284)
(PB82-115494; GRI-80/0054) Avail: NTIS HC A03/MF A01 CSCL 13A

Industrial burners that incorporate various NOx control techniques while maintaining the heat transfer characteristics of the flames suitable for the particular process application were investigated. NOx control by catalytic combustion, staged combustion, and/or recirculation is incorporated in the various burners. The program had three tasks, one for each of the burners: (1) to develop a direct fired air heater burner with catalyst to determine if it can burn natural gas under the conditions required to produce ultra low Nox levels; (2) a mounting rig was designed to allow the firing angle to be varied during the baseline trials on the Hauck burner; (3) the Bloom baseline baffle burner is installed, and the prototype Bloom burner for steel reheat furnaces is designed. GRA

N82-17688# JRB Associates, McLean, Va.
SOLID WASTE DATA: A COMPILATION OF STATISTICS ON SOLID WASTE MANAGEMENT WITHIN THE UNITED STATES
1981 74 p refs
(Contract EPA-68-01-6000)
(PB82-107301) Avail: NTIS HC A04/MF A01 CSCL 13B

A comprehensive compilation of the most current available information of solid waste management within the United States is presented. This information is in tabular form and organized by general categories for ease of reference. Factors such as employment in solid waste management, composition of solid wastes, collection methods, transportation, processing, and disposal are considered for both municipal and rural areas. GRA

N82-17689# California Univ., Davis. Dept. of Civil Engineering.
PERFORMANCE OF ACTIVATED SLUDGE PROCESSES: RELIABILITY, STABILITY AND VARIABILITY Final Report
Salar Niku, Edward D. Schroeder, George Tchobanoglous, and Francisco J. Samaniego Sep. 1981 165 p refs
(Grant EPA-R-805097)
(PB82-109604; EPA-600/2-81-227) Avail: NTIS HC A08/MF A01 CSCL 13B

The performance of a large number of activated sludge processes was statistically analyzed and procedures for introducing reliability and stability concepts into design and operation of treatment plants was developed. Using the log-normal distribution and a coefficient of reliability (COR), a probabilistic model and design tables and graphs were developed for predicting achievable effluent BOD and SS concentrations. The stability of various activated sludge processes was examined. The standard deviation was found to be the most appropriate indicator of stability. Correlations and regression analyses are used to investigate the cases of effluent quality variability and to identify the extend of the factors contributing to this variability. An approach that can be used to design a process stochastically when the effluent standards are deterministic in nature is presented. GRA

N82-17690# Colorado State Univ., Fort Collins. Dept. of Agronomy.
FIELD STUDIES ON USBM AND TOSCO 2 RETORTED OIL SHALES: VEGETATION, MOISTURE, SALINITY, AND RUNOFF Final Report, 1977 - 1980
M. K. Kilkelly, W. A. Berg, and H. P. Harbert, III Aug. 1981 120 p refs
(Grant EPA-R-804719)
(PB82-109810; EPA-600/7-81-139) Avail: NTIS HC A06/MF A01 CSCL 13B

The vegetative stabilization of processed oil shales and moisture and soluble salt movement within the soil/shale profile were investigated. Research plots with two types of retorted shales (TOSCO II and USBM) with leaching and soil cover treatments were established at two locations: low-elevation and high elevation. Vegetation was established by intensive management. N and P fertilization, seeding, mulching, and irrigation. After seven growing seasons, a good vegetative cover remains with few differences between treatments, with the exception of the TOSCO retorted shale, south aspect, which consistently supports less perennial vegetative cover than other treatments. With time, a shift from perennial grasses to dominance by shrubs is observed. GRA

N82-17691# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES. PROJECT: THERMAL TREATMENT. PROJECT LEADER: FEDERAL REPUBLIC OF GERMANY Final Report
23 Mar. 1981 183 p refs
(PB82-114521; NATO/CCMS-118) Avail: NTIS HC A09/MF A01 CSCL 13B

The incineration of hazardous waste in the participating countries is examined including topics such as co-incineration of hazardous wastes with domestic refuse, hazardous waste as a fuel substitute in the cement manufacturing industry, incineration of selected wastes (PCB, mineral oil wastes), incineration of harzardous wastes at sea, and research and development. GRA

N82-17692# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES: CHEMICAL, PHYSICAL AND BIOLOGICAL TREATMENT OF HAZARDOUS WASTES IN NATO COUNTRIES. PROJECT LEADER: UNITED STATES Final Report
9 Mar. 1981 145 p refs
(PB82-114539; NATO/CCMS-119) Avail: NTIS HC A07/MF A01 CSCL 13B

The state-of-the-art of technology for chemical, physical and biological treatment of hazardous industrial waste is reported. Hazardous waste management policies, waste treatment centers and the potential recovery of hazardous wastes are discussed. GRA

N82-17693# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES. PROJECT: LANDFILL RESEARCH. PROJECT LEADER: CANADA Final Report
16 Feb. 1981 56 p
(PB82-114547; NATO/CCMS-120) Avail: NTIS HC A04/MF A01 CSCL 13B

Problems associated with landfill disposal methods are discussed including: co-disposal, contaminant migration and attenuation, waste isolation, waste immobilization, landfill

procedures, long-term effect, leachate treatment, and national guidelines and/or regulations. Use of liner materials for landfills and of disposal in containers is discussed. Surface sealing of landfills to prevent leaching is discussed. GRA

N82-17694# NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
NATO-CCMS PILOT STUDY ON DISPOSAL OF HAZARDOUS WASTES: METAL FINISHING WASTES. PROJECT LEADER: FRANCE Final Report
Mar. 1981 281 p refs
(PB82-114554; NATO/CCMS-121) Avail: NTIS HC A13/MF A01 CSCL 13B

The metal finishing industry is described with emphasis upon its potential for polluting the environment. Control procedures and non-polluting and low-polluting processes are reviewed. Effluent treatment and its cost are studied. Legislation and practice concerning effluent treatment in various countries are reviewed. GRA

N82-17823# Joint Publications Research Service, Arlington, Va.
AEROSOLS DISTRIBUTION OF MICROORGANISMS IN A MANNED PRESSURIZED CHAMBER AND EFFECT OF ARTIFICIAL AIR IONIZATION
S. N. Zeloguyev, B. V. Anisimov, A. N. Viktorov, and V. P. Gorshkov *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 15, no. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 59-62 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 44-46 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17848# Joint Publications Research Service, Arlington, Va.
PHYSICAL FACTORS OF ENVIRONMENT AS HYGIENE PROBLEM
M. G. Shandala *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 17-26 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 1, Jan. 1981 p 9-16 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-17695 Minnesota Univ., Minneapolis.
HYDROGEOCHEMISTRY AND KINETICS OF SILICATE WEATHERING IN A GABBROIC WATERSHED: FILSON CREEK, NORTHEASTERN MINNESOTA Ph.D. Thesis
Donald Ira Siegel 1981 289 p
Avail: Univ. Microfilms Order No. 8126023

Results of the study indicate that Filson Creek is impacted by acid precipitation that enhances the dissolution process. For example, leaching of sulfate acidity during snowmelt increased sulfate concentrations in Filson Creek from less than 2 to as much as 12 milligrams per liter, and H + or - ion concentrations from 10 to minus 6.5 power to as much as .00001. Annual chemical budgets determined at five locations on the creek in 1977 show net losses of dissolved silica, bicarbonate, calcium, magnesium, and sodium of 30.9, 19.6, 3.8, 3.8, and 1.5 kilograms per hectare per year, respectively, and net gains of dissolved potassium and sulfate of 0.4 and 8.9 kilograms per hectare. On a molar basis, about 1.5 times as much magnesium was lost from the watershed than calcium, even though the amount of ferromagnesium minerals in till and bedrock underlying the watershed is about an order of magnitude less than the amount of calcium-plagioclase. Dissert. Abstr.

N82-17696 Bureau of Mineral Resources, Geology and Geophysics, Canberra (Australia). Geological Survey of Queensland.
GEOLOGICAL EVOLUTION AND ECONOMIC GEOLOGY OF THE BURDEKIN RIVER REGION, QUEENSLAND
K. R. Levingston and W. H. Oldham, ed. 1981 72 p refs
(BMR-BULL-208; ISSN-0084-7089; ISBN-0-642-05830-X)
Avail: NTIS HC A04

The geological history of the area is presented, from the Precambrian to the Cainozoic ages. The physiography of the land is described, and the economic aspects of the geology are discussed in relation to metals, fuels (coal and petroleum), and nonmetallic minerals. S.L.

N82-17697 Academy of Sciences (USSR), Moscow. Space Research Inst.
THE PLASMA ION COMPOSITION IN THE HIGH-LATITUDE MAGNETOSPHERIC BOUNDARY LAYER ACCORDING TO PROGNOZ-7 DATA
E. M. Dubinin, A. V. Zakharov, N. F. Pissarenko, R. Lundin (Kiruna Geophysical Inst., Sweden), and B. Hultqvist (Kiruna Geophysical Inst., Sweden) 1981 23 p refs Presented at the IAGA Assembly, Edinburgh, 1981
(Rept-658) Copyright. Avail: Issuing Activity

A mass analysis of the plasma in the high-latitude boundary layer (the plasma mantle) was made. Direct evidence was obtained that the ionosphere, similar to the solar wind, is a source of the plasmas in this region, filling it by ions (H+) and (O+). The number density of ionospheric ions (O+) in the mantle is usually several percent. During the disturbed periods it increases up to several tens of percent. Energies of these ions are several keV. The content of ions (O+) is usually much higher than that of ions (He+) that indicates the ionospheric but not plasmasphere origin of them. The mechanism of ion acceleration is probably such that it ensures an equal energy to all the ions independently or their mass. The content of ions (O+) correlates positively with the magnetospheric activity level. Author

N82-17698# Oregon State Univ., Corvallis.
ANALYSIS OF THE ATMOSPHERIC WATER VAPOR TRANSPORT AND HYDROLOGIC CYCLE SIMULATED IN A GLOBAL CIRCULATION MODEL Ph.D. Thesis
Jy-Tai Chang 1982 214 p
Avail: Univ. Microfilms Order No. 8126225

An atmospheric moisture balance is diagnostically analyzed from the January and July data of the atmospheric general circulation model, which was integrated for thirty-nine months of simulation with seasonally-varying sea-surface temperature and solar insolation. The model hydrologic processes analyzed for the balance include the surface evaporation, the precipitation by large-scale and cumulus condensation, the vertical transport by large-scale and cumulus mass fluxes, and the horizontal transport of water vapor. The large-scale transports include the contributions from the standing and transient components of motion. Also analyzed are the potential and stream functions of horizontal transport, and the statistics of seasonal and interannual variabilities of the global and hemispheric effects of the hydrologic processes. As a result of these analyses, the hydrologic cycle is constructed and understood for both January and July of the model. Dissert. Abstr.

N82-17699 Utah Univ., Salt Lake City.
SATELLITE SOUNDING OF CLOUD PARAMETERS AND TEMPERATURE PROFILES IN CLOUDY ATMOSPHERES FROM INFRARED AND MICROWAVE DATA Ph.D. Thesis
Hwa-Young Yeh 1981 181 p
Avail: Univ. Microfilms Order No. 8125908

The utilization of both infrared and microwave sounding channels for the simultaneous inference of the cloud parameters and temperature profiles in cloudy atmospheres is studied. The necessary parameterized equations for infrared and microwave radiative transfer were derived, and the retrieval programs were developed for the determination of the high cloud top height, high cloud thickness, low cloud top height, surface emissivities, cloud liquid water content, and temperature profile successively utilizing selected HIRS and SCAMS channels. Hypothetical error analyses were performed and it is found that the retrieval technique is theoretically rigorous and practically feasible. The retrieval technique is then applied to the Nimbus 4 HIRS and SCAMS data for a number of carefully selected cases associated with

summertime convective cloud systems and wintertime large scale synoptic cyclones. Cloud parameters and temperature profiles appear to be in qualitative agreement with the available synoptic, radiosonde, surface, and radar observations. Dissert. Abstr.

N82-17700 Washington Univ., Seattle.
FORBIDDEN 5200 ANGSTROMS EMISSION BY ATOMIC NITROGEN IN A MIDLATITUDE AURORA Ph.D. Thesis
Thomas C. Washington Tyler 1981 143 p
Avail: Univ. Microfilms Order No. 8126153

The little measured emission of the forbidden radiation at N(2D) 5200 A by metastable atomic nitrogen in a mid latitude aurora were studied. A new style of modulated interference filter photometer built to measure it is described. The new photometer uses a circle of collimating lenses and slits to collect and modulate the incidence angle at a fixed filter, thereby greatly increasing the collection aperture for weak light from a small region of the sky. Line and line ratios versus time are consistent with the input of low energy primary electrons and with the geometrical limits set by two station viewing. The measurements expand the available information on this minor emission at mid latitudes, identify its source as aurora give records of substantial intensity, and relate its strength to the derived energy spectrum of incident electrons. Dissert. Abstr.

N82-17701 North Carolina Univ. at Chapel Hill.
DEPOSITIONAL ENVIRONMENTS OF THE SUBSURFACE CRETACEOUS DEPOSITS OF SOUTHEASTERN NORTH CAROLINA Ph.D. Thesis
Edward Scheid Custer, Jr. 1981 221 p
Avail: Univ. Microfilms Order No. 8125569

The subsurface Cretaceous deposits of southeastern North Carolina were analyzed. Six lithologic units were recognized. These are, in ascending stratigraphic order: an unnamed Lower Cretaceous unit, Cape Fear Formation, unnamed Upper Cretaceous unit, Middendorf Formation, Black Creek Formation, and Peedee Formation. The unnamed Lower Cretaceous unit contains interbedded fine to medium grained sands, calcareous sandstones, sandy limestones and clays which were deposited in environments ranging from nearshore to fluvial. The Cape Fear Formation consists of very fine to coarse tan sands interbedded with brown and reddish clays. The Upper Cretaceous unnamed unit is composed of tan and yellow medium to coarse sands interbedded with tan and red clays deposited in braided fluvial environments. The Black Creek Formation consists of lignitic dark clays and coarse to very fine sands. Formation is composed of dark green to greenish-gray, micaceous, glauconitic clays and sands interbedded with calcareous sandstones or sandy limestones. Dissert. Abstr.

N82-17702 Illinois Univ. at Urbana-Champaign.
GEOLOGY AND GEOCHEMISTRY OF SPHALERITE IN COAL Ph.D. Thesis
James Collins Cobb 1981 220 p
Avail: Univ. Microfilms Order No. 8127568

The morphology of sphalerite vein walls in coal is investigated. Sphalerite veins postdate cleats and are often developed in cleats. Some sphalerite deposition was contemporaneous with subsidence of coal into sinkholes. Compactional features in the coal show that from 8 to 14 percent of the compaction in the coal occurred after sphalerite deposition commenced. A relationship between porosity, inherent moisture, and compaction of the host coals suggests that the sub-bituminous (B) rank achieved at the time of sphalerite deposition. Homogenization temperatures for the sphalerite fluid inclusions are nearly identical for the sphalerite from the Illinois and Forest City Basins and range from 75 to 113 C. There is a moderately high correlation coefficient (r = 75) between the vitrinite reflectance of the host coals and homogenization temperatures. This data may eliminate the possibility of fluid flow initiated by thermally-produced convection and raises the possibility of convection by compaction and loading of basin sediments. Dissert. Abstr.

N82-17703 Tulane Univ., New Orleans, La.
DEPOSITION AND DIAGENESIS OF GLAUCONITE SANDSTONE, BERRYMORE-LOBSTICK-BIGORAY AREA, SOUTH CENTRAL ALBERTA: A STUDY OF PHYSICAL CHEMISTRY OF CEMENTATION Ph.D. Thesis
Indurani Dayal Meshri 1981 178 p
Avail: Univ. Microfilms Order No. 8127777

Examination of logs, core descriptions, stratigraphic cross sections, sand-isolith and structure maps, regional geology and paleogeography reveal the depositional environments of the Glauconite Sandstone in the Berrymore-Lobstick-Bigoray area to be distributary channels, delta platform, distributary mouth bars, and interdistributary bays. Distributary channel-fill deposits are immature texturally and mineralogically. Their composition varies from submature feldspathic litharenites to immature feldspathic litharenites. Siderite, ankerite and illite are early cements. Abundant ankerite and some pyrite are found associated with the erosional base of the distributary channels with abundant clay clasts. Zones of pore-filling hematite are present as intermediate to late stage cement. Pore-lining to pore-filling kaolinite, pore-bridging illite and coarse crystalline siderite are late-stage cements. Dissert. Abstr.

N82-17704 Institut d'Aeronomie Spatiale de Belgique, Brussels.
CHEMICAL FLUCTUATIONS AND INCOHERENT SCATTERING THEORY IN THE TERRESTRIAL D REGION
G. Kockarts and J. Wisemberg 1981 34 p refs Submitted for publication
(Aeronomica-Acta-A-233-1981) Avail: Issuing Activity

The continuum theory of incoherently scattered electromagnetic waves is modified in order to include possible effects of thermally induced chemical fluctuations by introducing fluctuating parts in the production and loss terms of the continuity equations. An equivalent ionospheric model is developed for electrons and for negative and positive ions. A matrix formulation gives simultaneous access to fluctuating parts of each charged component. Numerical results indicate that chemical fluctuations are important over the height range where negative ions are comparable or > the electron concentration. Strong enhancements of the incoherent scatter cross section occur for frequency shifts < 20 Hz. A simple approximation is given for the contribution of chemical fluctuations. Author (ESA)

N82-17705 Institut d'Aeronomie Spatiale de Belgique, Brussels.
STRATOSPHERIC AEROSOL PROPERTIES FROM EARTH LIMB PHOTOGRAPHY AND MIE SCATTERING THEORY
M. Ackerman, C. Lippens, and C. Muller 1981 46 p refs Submitted for publication Original contains color illustrations
(Aeronomica-Acta-A-235-1981) Avail: Issuing Activity

A method for measuring stratospheric aerosol size distributions and density is described. Balloon-borne cameras simultaneously record various wavelengths of light from the Earth limb below the horizontal line of sight when solar elevation is low. Limb radiances are expressed in solar radiance units. The depression angles at which limb radiances are measured are related to the line of sight altitude of closest approach to the Earth surface. The measured integrated radiances can be inverted, taking into account absorption by ozone and air along the line of sight, in order to yield the in situ radiance per unit length versus altitude. The scattering angle of direct solar radiation is computed from the relation between the depression angle at which the atmospheric radiance is measured and the solar elevation angle at the time of measurement. The method is sensitive to particles of radius 0.04 to 0.4 microns. A larger number of particles of radius < 0.1 micron is estimated, compared to previous data. Author (ESA)

N82-17706*# Desert Research Inst., Reno, Nev. Atmospheric Sciences Center.
STRATOSPHERIC CCN SAMPLING PROGRAM Final Report, 1 Apr. 1981 - 22 Jan. 1982
C. Fred Rogers and James G. Hudson 22 Jan. 1982 59 p refs
(Grant NAG2-114)
(NASA-CR-168396) Avail: NTIS HC A04/MF A01 CSCL 04A

Two one liter grab samples of stratospheric aerosol were returned from each of six U-2 sampling missions. Cloud condensation nuclei (CCN) spectra from each sample were obtained. Interest was centered on the effects of volcanic activity. Spurious particle generation was found to be a serious problem in container 9 LFT and a much smaller problem in container 9 RT. Initial studies of an option for improved sample containers

and values were completed. A CCN spectrometer, able to operate at an internal pressure of 300 mb, was designed. N.W.

N82-17707*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.

EFFECTS OF MULTIPLE SCATTERING AND SURFACE ALBEDO ON THE PHOTOCHEMISTRY OF THE TROPOSPHERE Final Report, period ending 30 Nov. 1981

T. R. Augustsson and S. N. Tiwari Dec. 1981 264 p refs (Contract NCC1-30)

(NASA-CR-168417) Avail: NTIS HC A12/MF A01 CSCL 04A

The effect of treatment of incoming solar radiation on the photochemistry of the troposphere is discussed. A one dimensional photochemical model of the troposphere containing the species of the nitrogen, oxygen, carbon, hydrogen, and sulfur families was developed. The vertical flux is simulated by use of the parameterized eddy diffusion coefficients. The photochemical model is coupled to a radiative transfer model that calculates the radiation field due to the incoming solar radiation which initiates much of the photochemistry of the troposphere. Vertical profiles of tropospheric species were compared with the Leighton approximation, radiative transfer, matrix inversion model. The radiative transfer code includes the effects of multiple scattering due to molecules and aerosols, pure absorption, and surface albedo on the transfer of incoming solar radiation. It is indicated that significant differences exist for several key photolysis frequencies and species number density profiles between the Leighton approximation and the profiles generated with, radiative transfer, matrix inversion technique. Most species show enhanced vertical profiles when the more realistic treatment of the incoming solar radiation field is included E.A.K.

N82-17708*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SESSION III OF THE VLBI/LASER INTERCOMPARISON TASK OF THE NASA CRUSTAL DYNAMICS PROJECT

Henry Fliegel 1 Nov. 1981 50 p refs (Contract NAS7-100)

(NASA-CR-168427; JPL-Pub-81-96) Avail: NTIS HC A03/MF A01 CSCL 08E

Baseline vector measurements are reported for a line crossing most of the state of California from Quincy to Mt. Otay near the Mexican border. They were obtained to compare three space geodetic techniques: very long baseline interferometry, satellite laser ranging, and Doppler satellite tracking. A.R.H.

N82-17709# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

OBSERVATIONS OF LARGE SCALE F-REGION IRREGULARITIES USING AIRFLOW EMISSIONS AT 7774 DEG A AND 6300 DEG A

Y. Sahai, J. A. Bittencourt, N. R. Teixeira, and H. Takahashi Oct. 1981 24 p refs Submitted for publication Sponsored by the Brazilian Fund for Science and Technology

(INPE-2236-PRE/023) Avail: NTIS HC A02/MF A01

The measurements were made with a two-channel photometer which permitted scanning observations both along and across the magnetic meridian. Observations at 7774 A can detect large scale irregularities near the F-region peak height, whereas observations at 6300 A detect such irregularities at an altitude about 50 km to 100 km lower, depending on the F-region height. On several nights, during spread-F conditions, as indicated by an ionosonde operating at the same location, the presence of large intensity depletions of short duration were detected in both emissions. These depletions were observed to move towards the east in the east-west scans, and usually towards the south in the north-south scans. Salient features of these observations are presented and discussed. T.M.

N82-17710# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DIFFERENTIAL BEHAVIOUR OF THE EQUATORIAL IONOSPHERES ON THE EASTERN AND WESTERN COASTS OF THE SOUTH AMERICAN CONTINENT

Rajaram Purushottam Kane Oct. 1981 11 p refs Submitted for publication Sponsored in part by FNDCT

(INPE-2237-PRE/024) Avail: NTIS HC A02/MF A01

A comparison of the daily variation patterns of the geomagnetic field components H, Z, D and the ionospheric F sub 0 F sub 2, at the equatorial locations Huancayo (12 degrees S, 75 degrees W, dip + 1.9 degrees) on the west coast and Eusebio, Fortaleza (4 degrees S, 39 degrees W, dip - 3.5 degrees) on the east coast of the South American continent, shows that the equatorial electrojet and the associated fountain effect are weaker on the east coast. R.J.F.

N82-17711# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

PARTICLE PRECIPITATION AND ATMOSPHERIC X-AND GAMMA-RAYS IN THE SOUTH ATLANTIC MAGNETIC ANOMALY BY BALLOON EXPERIMENTS Progress Report, 1968 - 1981

Jose Marques daCosta Jun. 1981 10 p refs Presented at the 1st Aeronomy Workshop Brazil-Argentina, Foz do Iguacu, Brazil, 18-20 Jul. 1981 Sponsored in part by the Fundo Nacional de Desenvolvimento Cientifico e Technologico - FNDCT

(INPE-2119-RPE/343) Avail: NTIS HC A02/MF A01

Particle precipitation from the Van Allen belts into the atmosphere of the South Atlantic magnetic anomaly region, were observed with balloon-borne instrumentation. Balloons carrying onboard charged particle and X-and gamma ray detectors formed by plastic scintillators were used. Measurements of bremsstrahlung X-rays and low energy gamma rays as well as the charged particles themselves were made at the altitude of the stratospheric balloons, and simultaneous measurements of the geomagnetic variations were made by rapid run ground magnetometers. S.L.

N82-17712# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

LARGE HORIZONTAL ELECTRIC FIELDS MEASURED AT HEIGHTS OF THE BRAZILIAN MAGNETIC ANOMALY AND ASSOCIATION TO LOCAL ENERGETIC PARTICLE PRECIPITATION

W. D. Gonzalez, A. E. C. Pereira, I. M. Martin, S. L. G. Dutra, O. Pinta, Jr., J. Wygant (California Univ., Berkeley), and F. S. Mozer (California Univ., Berkeley) Jun. 1981 12 p refs Presented at the 1st Aeronomy Workshop Brazil-Argentina, Foz do Iguacu, Brazil, 18-20 Jul. 1981 Submitted for publication

(INPE-2120-RPE/344) Avail: NTIS HC A02/MF A01

Large scale electric fields were measured, by balloon flights, at the Brazilian Magnetic Anomaly with double probe detectors. The results of the flight during a time interval with fair weather at the observing region and enhanced geomagnetic activity are reported. It is suggested that a BAND of precipitating energetic particles, moving equatowards with respect to the balloon, produce a conductivity enhancement down to the middle atmosphere, distorting the vertical atmospheric electric field and giving rise to the type of horizontal fields. E.A.K.

N82-17713*# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

PLASMA AND ELECTRIC FIELD BOUNDARIES AT HIGH AND LOW ALTITUDES ON JULY 29, 1977

J. F. Fennell, R. G. Johnson (Lockheed Missiles and Space Co., Palo Alto, Calif.), D. T. Young (Bern Univ., Switzerland), R. B. Torbert (California Univ., Berkeley), and T. E. Moore (New Hampshire Univ., Durham) 12 Jan. 1982 46 p refs Sponsored in part by NASA, Washington and by the Swiss National Science Foundation

(Grants NSF ATM-80-00518; NSF ATM-78-03600)

(NASA-CR-165118; ATR-82(7883)-2) Avail: NTIS HC A03/MF A01 CSCL 04A

Hot plasma observations at high and low altitudes were compared. The plasma ion composition at high altitudes outside the plasmasphere was 0+. Heavy ions were also observed at low altitudes outside the plasmasphere. It is shown that at times these ions are found well below the plasmapause inside the plasmasphere. Comparisons of the low altitude plasma and dc electric fields show that the outer limits of the plasmasphere is not always corotating at the low L-shells. The corotation boundary, the estimated plasmapause boundary at the boundary of the inner edge of plasma sheet ions were at the same position. The inner edge of plasma sheet electrons is observed at higher latitudes than the plasmasphere boundary during disturbed times. The inner edge of the plasma sheaths shows a strong dawn to dusk

asymmetry. At the same time the inner edge of the ring current and plasma sheath also moves to high latitudes reflecting an apparent inflation of the magnetosphere. E.A.K.

N82-17714*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME NEW METHODS IN GEOMAGNETIC FIELD MODELING APPLIED TO THE 1960 - 1980 EPOCH
R. A. Langel, R. H. Estes (Business and Technological Systems, Seabrook, Md.), and G. H. Mead Dec. 1981 42 p refs Submitted for publication
(NASA-TM-83868) Avail: NTIS HC A03/MF A01 CSCL 08N

The utilization of satellite and surface data together permitted the incorporation of a solution for the anomaly field at each observatory. The residuals of the observatory measurements to such models is commensurate with the actual measurment accuracy. Incorporation of the anomaly estimation enabled the inclusion of stable time derivatives of the spherical harmonic coefficients up to the third derivative. A spherical harmonic model is derived with degree and order 13 in its constant and first time derivative terms, six in its second derivative terms and four in its third derivative terms. E.A.K.

N82-17715*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE AND SURFACE GEOPHYSICAL EXPRESSION OF ANOMALOUS CRUSTAL STRUCTURE IN KENTUCKY AND TENNESSEE
M. A. Mayhew (BTS, Inc.), H. H. Thomas, and P. J. Wasilewski Jul. 1981 29 p refs
(NASA-TM-82163) Avail: NTIS HC A03/MF A01 CSCL 08N

An equivalent layer magnetization model is discussed. Inversion of long wavelength satellite magnetic anomaly data indicates a very magnetic source region centered in south central Kentucky. Refraction profiles suggest that the source of the gravity anomaly is a large mass of rock occupying much of the crustal thickness. The outline of the source delineated by gravity contours is also discernible in aeromagnetic anomaly patterns. The mafic plutonic complex, and several lines of evidence are consistent with a rift association. The body is, however, clearly related to the inferred position of the Grenville Front. It is bounded on the north by the fault zones of the 38th Parallel Lineament. It is suggested that such magnetization levels are achieved with magnetic mineralogies produced by normal oxidation and metamorphic processes and enhanced by viscous build-up, especially in mafic rocks of alkaline character. E.A.K.

N82-17716# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
A SEISMIC STUDY ON CRACKS IN CRYSTALLINE ROCK
Hans Israelson Jul. 1981 24 p refs Sponsored by Swedish National Council for Radioactive Waste
(FOA-C-20417-E1) Avail: NTIS HC A02/MF A01

Results from a field study with in-situ seismic measurements in crystalline rock are summarized. It was found that among a few potential seismic techniques the so called cross hole method would probably provide the most powerful capability for detecting cracks and fracture zones. By this method the area between two holes are systematically scanned by seismic raypaths. Seismic signals are generated in one hole by microexplosions and recorded in the other at various combinations of depths. A test sample of scanning data showed a rather dramatic variation of the seismic P-wave velocity (5-6 km/s). Analysis procedures like tomographic imaging was applied to this data set primarily to illustrate the kind of structural mapping such procedures can provide. Author

N82-17717# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
HIGH LATITUDE DAYSIDE PRECIPITATING ELECTRON REGIONS DURING THE SOUTHERN HEMISPHERE SUMMER AND THEIR DEPENDENCE OF IMF AND K SUB P
M. Candidi, H. K. Kroehl (NOAA, Boulder, Colorado), and C.-I. Meng (Applied Physics Lab., Laurel, Maryland) May 1981 30 p refs Sponsored in part by ESA
(IPS-81-4) Avail: NTIS HC A03/MF A01

The influence of the IMP Bz and By polarity on the location of precipitation regions of low energy electrons recorded by DMSP F-2 is studied. The average electron flux of the regions is analyzed as a function of the corrected geomagnetic coordinates in the dayside southern hemisphere. The average precipitation patterns are similar for the channels below 434 eV. The current carried by these particles agrees with the TRIAD measurements of the cleft field-aligned currents. When Bz > 0, the lower energy channels reveal a marked asymmetry between the By < 0 and By > cases. When By > 0, the maximum of the flux of precipitating electron is located between 0800 and 1200 MLT and between -76 and -83 degrees MLAT. When By < 0, the maximum is located between 1200 and 1600 MLT and between -79 and -82 degrees MLAT. The general dynamics associated with Bz < 0 obscure this By effect. Author

N82-17718# SRI International Corp., Menlo Park, Calif.
A STEPPED-FREQUENCY HF RADAR FOR IONOSPHERIC DIAGNOSTICS Topical Report, 16 Jun. 1980 - 16 Jan. 1981
Juris Petricoks, Charles L. Rino, and Walter G. Chesnut 20 Mar. 1981 32 p refs
(Contract DNA001-80-C-0255; SRI Proj. 1827)
(AD-A107810; DNA-5723T) Avail: NTIS HC A03/MF A01 CSCL 04/1

Naturally occurring ionospheric disturbances generate structure over an extremely large range of scale sizes and intensities. To diagnose the interacting plasma processes that cause this structure continuum requires a variety of complex instruments. This report describes a multiple-frequency HF backscatter radar that can measure the Doppler spectrum of structure in the scale-size region from tens of meters to meters. This structure regime is important in its own right and acts as tracer for macroscale parameters such as plasma depletions, currents, and electric fields. Author (GRA)

N82-17719# Systems Science and Software, La Jolla, Calif.
DETECTION, LOCATION AND IDENTIFICATION OF EXPLOSIONS AND EARTHQUAKES USING REGIONAL SEISMIC DATA RECORDED AT A SINGLE STATION Final Report, Aug. 1980 - Aug. 1981
J. R. Murphy Jun. 1981 85 p refs
(Contract ACDA-ACOMC107)
(AD-A107587; SSS-R-81-5010) Avail: NTIS HC A05/MF A01 CSCL 17/10

The results of an analysis of the various factors affecting the detection, location, and event identification capability of a single seismic station in the regional distance range are summarized. A regional seismic detection model is described and applied to the evaluation of the frequency dependent detectability of underground explosions in various source media. On the basis of these analyses it is concluded that P waves from explosions with yields as small as 1 kt should be detectable at ranges on the order of 1000 km or more over regional propagation paths characteristic of the Eastern U.S. Event location capability associated with single station seismic data is assessed. It is concluded that epicentral distance accuracies on the order of 10 to 15 km and source azimuth accuracies of better than 10 degrees are achievable using routinely available data processing procedures. GRA

N82-17720# World Meteorological Organization, Geneva (Switzerland).
REPORT OF THE SECOND SESSION OF THE JOINT SCIENTIFIC COMMITTEE Global Atmospheric Research Programme
1981 162 p refs Presented at Vienna, 17-26 Mar. 1981 Sponsored by Global Atmospheric Research Programme and World Climate Research Programme Prepared in cooperation with ICSU, Rome
Avail: NTIS MF A01; print copy available at WMO, Geneva, SwFr 25

Work to date and planned experiments are reported on the global weather experiment, the GARP Atlantic tropical experiment, the GARP mountain subprogram, and the world climate program are described. Climatologically significant parameters are discussed, i.e., cloudiness and radiation, ocean processes,

ocean-cryosphere processes, hydrology and land surface processes, radiatively important gases, and aerosols. The use of satellite soundings is outlined. Status of the various projects is determined. Author (ESA)

N82-17721# World Meteorological Organization, Geneva (Switzerland).
REPORT OF THE THIRD SESSION OF THE WEST AFRICAN MONSOON EXPERIMENT (WAMEX) SCIENTIFIC REGIONAL COMMITTEE Global Atmosphere Research Programme
1981 202 p refs In ENGLISH and FRENCH Presented at Geneva, 10-14 Nov. 1980 Prepared in cooperation with ICSU, Rome
(GARP-Spec-Rept-37) Avail: NTIS MF A01; print copy available at WMO, Geneva

After completion of the field phase of WAMEX, operations were assessed, further planning of data management activities was reviewed, and plans for the research and evaluation phase were coordinated. The WAMEX project was conducted concurrently with the first GARP Global Experiment. Impending data collection and processing activities are stressed in plans to promote the timely and complete analysis of the present situation. The advantages to be gained through international cooperation among scientists are emphasized. Author (ESA)

N82-17722# Research Inst. of National Defence, Stockholm (Sweden).
SEISMOLOGY 1980, NUCLEAR TEST BAN VERIFICATION, EARTHQUAKE AND EARTH RESOURCE INVESTIGATION Progress Report, 1980
Brittmarie Tygaard Oct. 1981 69 p refs Sponsored by National Council for Radioactive Waste
(FOA-C-20427-T1) Avail: NTIS HC A04/MF A01

Seismological projects are reported, including nuclear explosion monitoring, the development of international data centers, seismic risk estimation for nuclear power plants, oil exploration using seismic methods, and crystalline rock investigation using seismic cross hole measurements. The Swedish seismic network is described. In 1980, China conducted 1 nuclear test, France 11, Britain 3, the US 14, and the USSR 21. Apart from the Chinese test, the explosions were underground and within the 150 kton limit. France is the only country which increased the number of tests compared with previous years. Author (ESA)

N82-17723# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
TOWARD GLOBAL MONITORING OF THE IONOSPHERE IN REAL TIME BY A MODERN IONOSONDE NETWORK: THE GEOPHYSICAL REQUIREMENTS AND TECHNOLOGICAL OPPORTUNITY
J. W. Wright and A. K. Paul Jul. 1981 72 p refs Original contains color illustrations
(PB82-106444; NOAA-81081803) Avail: NTIS HC A04/MF A01 CSCL 04A

Current developments in ionospheric sounders demonstrate the advantages of fully computer-interactive systems and digital data acquisition, in which all aspects of system control and real-time data processing are software-defined. Priority is being given to vertical-incidence capabilities, and particularly to automatic estimation of the electron density distribution and its time variation. Two or more such instruments can obtain measurements bistatically to sample ionospheric properties at intermediate locations. Measureable properties, whether by vertical or oblique sounding, include the time and frequency dependence of group path and phase, the signal amplitude, the echo direction of arrival and polarization. GRA

N82-17724# Cambridge Univ. (England). Dept. of Engineering.
CONE PENETROMETER AND LIQUID LIMIT
1981 22 p refs
(PB82-113507; CUED/D-SOILS/TR-101-1981; ISSN-0309-7439) Avail: NTIS HC A02/MF A01 CSCL 08M

The use of the cone penetrometer to determine the liquid limit of soils is briefly discussed. Published data of shear strength at moisture contents near the liquid limit, and of penetrations of the fall cone of angle 30 degrees and weight 80gf into soils at water contents near the liquid limit, are compared. It is concluded that strength tends to decrease and cone penetration to increase with the value of the liquid limit and that consequently precise correspondence between liquid limits determined with the cone penetrometer and with the traditional Casagrande apparatus is not to be expected. The satisfactory predictive ability of a simple expression relating compression index and plasticity index is demonstrated. GRA

N82-17725# Technische Universitaet, Brunswick (West Germany). Naturwissenschaftliche Fakultaet.
ON THE GEOLOGY, GEOCHEMISTRY AND GENESIS OF THE TOM Pb-Zn-BARITE DEPOSIT, YUKON TERRITORY, CANADA Ph.D. Thesis
Duncan Large 1981 161 p refs
(PB82-116708) Avail: NTIS HC A08/MF A01 CSCL 08G

The Tom Pb-Zn-barite prospect was discovered in 1951 by prospectors working for the Hudson Bay Exploration and Development Company. The prospect is located close to the border between the Yukon Territory and the Northwest Territories, Canada. The Tom deposit is still under evaluation and no decision has been made to mine the ore. To date company work has consisted of surface geological mapping, Diamond drilling and an underground exploratory drive. The recognition of the Tom as an example of sediment-hosted, submarine exhalative mineralization, and the recent discovery of further occurrences of similar mineralization at the same stratigraphic horizon within the Selwyn Basin, raises the possibility that the eastern Yukon could become a very important Pb-Zn-barite mining camp. GRA

N82-17726 Texas Univ. at Dallas.
THE SEISMICITY OF FOREARC MARGINAL WEDGES (ACCRETIONARY PRISMS) AND SEISMOTECTONICS OF CONVERGENT MARGINS Ph.D. Thesis
Tzann-Hwang Chen 1981 123 p
Avail: Univ. Microfilms Order No. 8126593

Three different types of seismic data from island arc regions were examined: teleseismically-recorded earthquakes that were reported in the literature as occurring in major arc-trench regions; local earthquakes located by combined ocean bottom seismograph and land networks in the arc-trench region in the New Hebrides and the central and eastern Aleutian Trench; and S-P intervals measured at stations on islands located on the outer ridge or at ocean bottom seismograph stations on the forearc marginal wedge. The results indicate that: primary normal faulting occurs in the top of Benioff zone underneath the active margin; primary thrust faulting occurs in the active margin of overriding plate and the angle between the axis of the compressional stress and the downdipping slab is increased with depth, and primary normal faulting is also found above the zone of thrust faulting in the shallowest part of the overriding plate in New Habrides. Dissert. Abstr.

N82-17727 Texas Univ. at Dallas.
PETROLOGY OF THE ULTRAMAFIC XENOLITHS ON THE KOOLAU SHIELD, OAHU, HAWAII. PART 1: LIQUIDUS PHASE RELATIONS ON THE JOIN ANORTHITE-FORSTERITE-SILICA AT 10 kBAR, PART 2 Ph.D. Thesis
Gautam Sen 1981 204 p
Avail: Univ. Microfilms Order No. 8126595

On the basis of petrography and mineral chemistry, the xenoliths were classified into three major xenoliths suites: dunite, spinel lherzolite, and pyroxenite suites. Apart from these major suites, xenoliths with distinct cumulate feature, and a plagioclase-spinel lherzolite xenoliths occur. The dunites are interpreted to represent cumulates rather than residual from partial fusion. For liquid phase relations three piercing points were found: two of them are generated by the reaction curves liquid + spinel = anorthite + enstatite and liquid + forsterite = spinel + enstatite. The third piercing point represents the univariant curve along which anorthite, diopside, and a hi-quartz crystallize in equilibrium. Dissert. Abstr.

N82-17728 Texas Univ. at Dallas.
THE BIOSTRATIGRAPHY AND TAXONOMY OF MESOZOIC RADIOLARIA FROM THE SAMAIL OPHIOLITE AND HAWASINA COMPLEX, OMAN Ph.D. Thesis
Phyllis Russell Tippit 1981 403 p
Avail: Univ. Microfilms Order No. 8126594

Radiolarian biostratigraphic data confirms the hypothesis that rocks exposed in the Oman Mountains were deposited in a Mesozoic ocean basin and later tectonically emplaced in a vertical stratigraphic sequence. Radiolaria extracted from mudstones interbedded with the pillow lavas at the top of the Samail Ophiolite were Late Cretaceous (Cenomanian) in age, indicating a Cenomanian age of origin for the Ophiolite. Samples from the Haliw Formation of the Hawasina Complex were Triassic in age. No older pelagic sediments were found. These Haliw sediments, together with a Late Triassic horizon at the base of the Halfa Formation, overlie basalts and may represent deep-water sedimentation early in the basin's history. The longest sections of radiolarian chert and mudstone were deposited during another period of regional deepening and pelagic sedimentation during the Late Jurassic and Early Cretaceous. Dissert. Abstr.

N82-17729 Colorado State Univ., Fort Collins.
ENERGY TRANSPORT WITHIN THE EARTH'S ATMOSPHERE OCEAN SYSTEM FROM A CLIMATE POINT OF VIEW Ph.D. Thesis
George Garrett Campbell 1981 167 p
Avail: Univ. Microfilms Order No. 812642

The Earth's atmosphere-ocean system is considered from an energy balance point of view. The monthly mean satellite observations of the radiation budget are discussed. In particular the Nimbus 6 Earth Radiation Budget experiment is emphasized since it contributes half of the radiation data. The many sources of measurement error are presented with the conclusion that about half of the + or - 9W/sq m errors in the net radiation comes from systematic errors. From the annual net radiation map the divergent component of the flux of energy was calculated. This vector field shows the expected equator to pole energy transport but it also shows substantial eastwest flows. The magnitude of the west-east components is about the same as the deviations from the latitude zonal mean of the north-south fluxes. The global circulation divides into an eastward and westward flow hemisphere with zero flux line at 20 deg E and 190 deg E. Dissert. Abstr.

N82-17730 Florida State Univ., Tallahassee
THE KINEMATIC AND METAMORPHIC DEVELOPMENT OF THE TOWALIGA-GOAT ROCK MYLONITES, GEORGIA-ALABAMA Ph.D. Thesis
Willis Algeon Holland, Jr. 1981 116 p
Avail: Univ. Microfilms Order No. 8127540

The Towaliga-Goat Rock and Bartletts Ferry deformation zones are major tectonic boundaries of the southeastern Piedmont. The Towaliga zone separates the Pine Mountain Belt and the Inner Piedmont and the Goat Rock and Bartletts Ferry Zones separate the Pine Mountain and Uchee Belt. The Uchee Belt is composed of granitic gneisses and amphibolites modified by deformational phases, each represented by distinctive mesoscopic folding patterns. The earliest is a poorly developed folding of obscure compositional layering. Later leucocratic banding is folded by recumbent isoclines with subhorizontal axial plane cleavage. Intensification of cleavage to the northwest produces the southeast dipping mylonitic foliation of the Goat Rock and Bartletts Ferry Zone. Mesoscopic structural patterns is accounted for by regional compressive folding accompanied by ductile drag folding and mylonitization on the limbs of a major anticlinal structure. Dissert. Abstr.

N82-17731 Michigan Univ., Ann Arbor.
GEOLOGY, MINERALOGY, AND GEOCHEMISTRY OF THE MCCLURE MOUNTAIN ALKALIC COMPLEX, FREMONT COUNTY, COLORADO Ph.D. Thesis
Donald Henry Alexander 1981 352 p
Avail: Univ. Microfilms Order No. 8125054

The McClure Mountain alkalic complex is evolved from a consanguineous suite of gabbroic, syenitic, and lamprophyric magmas. Field, mineralogical, and chemical data suggest several differentiation hypotheses which are tested by means of linear least squares mixing models. Initially, partial melting of alkali peridotite produced parental nepheline-normative alkali basalt magma. A part of this magma ascended to shallow crustal levels along deep-seated faults and differentiated to a stratiform body of cumulitic olivine gabbros, gabbros, anorthosites, and magnetite-ilmenite ores. Petrographic studies, graphical analyses, and modeling support the hypothesis that the late lamprophyres were formed by mixing of a partly crystalline alkalic basalt magma with syenitic magma. Models rule out the hypothesis that the lamprophyres can be parental to syenite and gabbro. Progressive changes in the petrography along the strike of individual lamprophyres can be explained by differentiation during transport. Dissert. Abstr.

N82-17732 California Univ., San Diego.
THE DIAGENESIS OF MARINE CARBONATE SEDIMENTS: EXPERIMENTAL AND NATURAL GEOCHEMICAL OBSERVATIONS Ph.D. Thesis
Paul Arthur Baker 1981 153 p
Avail: Univ. Microfilms Order No. 8125435

Analysis of Sr and Ca ratios of several deep-sea carbonate sediments and porewaters shows that Sr is expelled by the solids during recrystallization and transported in solution out of the system. Quantitative treatment of these data reveals that: (1) most ancient limestones have undergone major chemical exchange only with marine pore fluids; (2) limestone cement is largely derived from within the original carbonate pile; (3) externally-imposed fluid flow is not a prerequisite for total carbonate recrystallization; (4) the values of the distribution coefficient of Sr in calcite appropriate for diagenetic studies were determined in laboratory experiments. Experimental replacement of calcite by dolomite under a variety of conditions indicates that dolomitization can take place in marine and lacustrine environments only under the following two conditions: (1) low dissolved sulfate concentrations, and (2) insubstantial contemporaneous silica diagenesis. Three sectors of North Sea Mastrichtian and Danian age chalks were studied geochemically. At one site in the Vern field, large amounts of isotopically heavy carbon, derived from microbial degradation of organic material, were incorporated into the carbonate during diagenesis. Dissert. Abstr.

N82-17733 Columbia Univ., New York.
GEOLOGICAL INVESTIGATIONS OF PRE-LATE JURASSIC TERRANES IN THE SOUTHERNMOST ANDES Ph.D. Thesis
Randall David Forsythe 1981 298 p
Avail: Univ. Microfilms Order No. 8125286

Pre-Late Jurassic terranes of the Patagonian Archipelago were investigated. Their regional stratigraphic and structural characteristics were surveyed. Their significance in the late Paleozoic to early Mesozoic evolution of South America were determined. Pre-Late Jurassic rocks within the archipelago are distributed in two belts. Within the outer belt the Madre de Dios Archipielago was studied in detail. Pre-Late Jurassic rocks of this area are divisibtle into three mappable units. These three units are interpreted to be part of a late Paleozoic to early Mesozoic accretionary prism that was located along the ancestral Pacific margin of the South American sector of Gondwana. Within the inner belt, the region of Peninsula Staines was studied in detail. In this region greenschist facies metamorphism and pervasive deformation fabrics prevent stratigraphic subdivision of the terrane. However the lithologies present are correlative with the outer belt suggesting that they also were part of the late Paleozoic to early Mesozoic accretionary prism. Dissert. Abstr.

N82-17734 Washington Univ., Seattle.
THE GEOCHEMISTRY OF SULFUR AND CARBON IN BASALTIC MELTS Ph.D. Thesis
Edmond Albigese Mathez 1981 153 p
Avail: Univ. Microfilms Order No. 8126125

Submarine basaltic lavas generally erupt in a sulfide-saturated state. Concentrations of sulfur dissolved in glasses are in the range 1000 to 1800 ppm and exhibit nearly perfect covariance with iron concentration, implying that the equilibrium governing sulfide stability in basaltic magmas is FeO + 1/2S2 reversible reaction FeS + 1/2O2. The iron contents of sulfide-saturated melts control f sub S sub 2 and f sub O sub 2. However, the range of iron contents of most basalts suggests that these variables are nearly identical for tholeiitic magmas at equivalent temperatures. Crystallization of plagioclase and olivine drive residual magma compositions along paths approximately parallel to the sulfide-saturation surface. Consequently, large

quantities of sulfides will not separate until the relatively late stages of fractional crystallization. Dissert. Abstr.

N82-17735 Columbia Univ., New York.
STRATIGRAPHY OF THE WESTERN NORTH ATLANTIC BASED ON THE STUDY OF REFLECTION PROFILES AND DSDP RESULTS Ph.D. Thesis
Gregory Stuart Mountain 1981 331 p
Avail: Univ. Microfilms Order No. 8125352

Three hundred thousand km of single- and multichannel reflection profiles from the western North Atlantic were examined. Basement and ten sedimentary reflectors were recognized, and type profiles for each are identified and described. Two-way travel time to all reflectors were digitized along 30,000 km of the best profiles. Regression analysis of sound velocities measured along the IPOD line provides linear equations of interval velocity vs. one-way time that are superior to those derived from sonobuoy wide-angle reflections, and three equations which describe horizontal and vertical velocity variations were derived. Using these equations, each digitized profile was converted from travel time to depth, and thickness between adjacent reflectors and total depth to basement were calculated and contoured in nine basin-wide maps. Results from 25 DSDP boreholes and 2 COST wells were integrated with the seismic stratigraphy. Dissert. Abstr.

N82-17736 Connecticut Univ., Storrs.
AN APPLICATION OF RAY THEORY TO THE INVESTIGATION OF SEISMIC HEAD WAVE POST-Pn PHASES Ph.D. Thesis
Edward Joseph Close 1981 185 p
Avail: Univ. Microfilms Order No. 8125450

At epicentral distances between 200 and 1,000 kilometers the first energy to arrive from a seismic event is generally identified as a compressional headwave, Pn. According to Snell's Law, there are eleven separate waveforms to be expected, following Pn. These are termed the post-Pn phases and are the result of various conversions upon reflection from the surface, refraction along the uppermost mantle as a compressional wave, and returning to the surface as a compressional or shear phase. These post-Pn phases are expected to arrive at the seismic station in one to twenty seconds after the Pn event and prior to the P* event, which has traveled along the Conrad discontinuity. For the shorter epicentral distances, in the 200 kilometer range, some of the post-Pn phases are seen to arrive after P*. Only the earthquakes which will have originated from a shallow, crustal focus, usually of three to twenty kilometer depth are considered. Dissert. Abstr.

N82-17737 Utah Univ., Salt Lake City.
TIME DEPENDENT THERMAL MODELING OF PLATE TECTONIC PROCESSES Ph.D. Thesis
Kevin Patrick Furlong 1981 149 p
Avail: Univ. Microfilms Order No. 8125899

Three dimensional evolution of convergence plate boundaries and triple junctions, coupled with time dependent thermal modeling using the Method of Lines numerical techniques is discussed. The path which subducting lithosphere follows can be broken into three regions: (1) a sub-horizontal region of nearly constant dip near the trench; (2) a region of rapidly increasing dip; (3) a region generally deeper than 125 km, again of nearly constant dip. Modeling of the thermal evolution of subducting slabs as they pass through these three regions, with the actual path simulated by appropriate time dependent boundary conditions, indicates that the geometry of the slab in region can be related directly to the thermal structure of the slab, and thus indirectly to the age and velocity of the subducting lithosphere. Rapid increase in convergence velocity can provide an enabling mechanism for back-arc spreading, while migration of the arc, uplift, enhanced heat flow, and crustal partial melt can result from the subduction of progressively younger lithosphere. Dissert. Abstr.

N82-17738 Michigan Univ., Ann Arbor.
TERRESTRIAL HEAT FLOW OVERLYING THE ANDEAN SUBDUCTION ZONE Ph.D. Thesis
Steven George Henry 1981 204 p
Avail: Univ. Microfilms Order No. 8125124

As a result of a geothermal investigation, thirty-four new heat flow sites in the countries of Peru, Bolivia, and Brazil were established. The Andes were divided into five regions based on their apparently different uplift and erosional histories. The heat flow in each of these regions can be interpreted in terms of their past tectonic and magmatic history, which in turn is most likely related to the angle of subduction. In central Peru the heat flow is low and the angle of subduction is low 10 to 15 deg., in southern Peru and northern Bolivia the heat flow is intermediate where the subducted plate is transition from low to higher angle subduction, and directly east of the active and recent volcanism of central and southern Bolivia the heat flow is high and the angle of subduction reaches 30 deg. Explanations for the low heat flow include the possibility that magnetic injections in regions of compression yield a relatively small thermal perturbation, and the low angle of subduction may result in an underplating of the continent. Dissert. Abstr.

N82-17739 Columbia Univ., New York.
ANOMALOUS RADON (222) EMISSION AND ITS ASSOCIATION WITH EARTHQUAKES AND TECTONISM Ph.D. Thesis
Egill Hauksson 1981 161 p
Avail: Univ. Microfilms Order No. 8125301

During 1978 and 1979 radon content in groundwater from nine geothermal wells in Iceland was monitored to correlate possible precursory changes in radon content with local seismicity. Radon emission from fumaroles at Krafla volcano in north Iceland was monitored to establish a possible relationship between radon emission and ongoing episodic microseismicity, rifting, and volcanism. To shed light on the physical basis of anomalous radon emission as a precursor to earthquakes, world-wide radon data are interpreted in terms of recent results in rock mechanics. Dissert. Abstr.

N82-17740 Northwestern Univ., Evanston, Ill.
KINEMATIC THERMAL MODELS OF THE EARTH'S MANTLE Ph.D. Thesis
Robert Thomas Langan 1981 84 p
Avail: Univ. Microfilms Order No. 8124938

The thermal evolution of the mantle geotherm under oceanic lithosphere was examined using a numerical simulation for a radially symmetric Earth. The viscosity of the mantle is assumed to be low enough to allow slabs to sink to near the core-mantle boundary. The return flow to ridges is modelled as a uniform vertical mass flux. The spreading rate and the resulting vertical mass flux are assumed to be constant over each of two major time periods in the Earth's history: from the approximate time for formation, 4.55 billion years before present (bybp), to the end of the Archean (here assumed to be 2.76 bybp) and from the end of the Archean to the present. This break is consistent with a global change in geotectonic style. Dissert. Abstr.

N82-17741 Columbia Univ., New York.
ON THE TECTONIC EVOLUTION OF THE PHILIPPINE PLATE: MARINE GEOPHYSICAL AND GEOLOGICAL STUDIES OF THE PARECE VELA BASIN, THE WEST PHILIPPINE BASIN AND THE MARIANA FORE ARC Ph.D. Thesis
Cary Louis Mrozowski 1981 214 p
Avail: Univ. Microfilms Order No. 8125353

The Parece Vela Basin, which forms much of the eastern Philippine Plate, is divided into two topographic provinces by the north-trending Parece Vela Rift. The rough western province is thinly sedimented and has a north-trending basement fabric. The eastern province is thickly blanketed by sediments derived from the West Mariana Ridge. The Parece Vela Rift is composed of discrete deeps which typically exceed 6 km in depth. Geochemical and seismic data show the basin crust to be oceanic. The oceanic West Philippine Basin forms the western half of the Philippine Plate and can be subdivided into three basins. The Mariana arc trench system is along the eastern edge of the Philippine Plate. The Mariana fore arc deepens gradually from the Mariana Ridge to the trench slope break. The sediment-smoothed seafloor is frequently offset 10 to 250 m across faults; below seafloor intrasediment and basement reflectors are also offset. The faults, which are active, are high-angle normal faults. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-17742 Illinois Univ. at Urbana-Champaign.
CLIMATIC INFLUENCES OF RESIDENTIAL ENERGY CONSUMPTION Ph.D. Thesis
Stewart Jay Cohen 1981 193 p
Avail: Univ. Microfilms Order No. 8127570

A climatic index, applicable to the estimation of residential energy consumption was developed. The index is based on seasonal frequencies of upper-air (500-mb height) circulation patterns. A multivariate statical technique, principal component analysis with oblique rotation of eigenvectors was used to classify 33 years of daily 500-mb height anomaly, patterns into 30 components. Each component represents two modes, positive and inverse, thereby resulting in sixty 500-mb types. Additional aggregation procedures reduced the number of types to 48. 78% of all days were categorized by this method. Two sets of regression analyses were performed on the data base, on set using 500-mb type frequencies, the other using population weighted heating degree days (POPHDD) and unweighted heating degree days (HDD). Results show that the 500-mb type frequency is a better climatic index of long term residential natural gas consumption than either HDD or POPHDD. Dissert. Abstr.

N82-17743 Michigan State Univ., East Lansing.
MOISTURE STRESS AND MID-TROPOSPHERIC CIRCULATION PATTERNS INFLUENCING THE FOREST-PRAIRIE TRANSITION IN SOUTH CENTRAL UNITED STATES Ph.D. Thesis
William Thomas Corcoran 1981 191 p
Avail: Univ. Microfilms Order No. 8126485

The characteristics and frequency of mid-tropospheric wind patterns controlling the distribution of climate in the south central states were investigated. Two climatic variables, vapor pressure deficit (VPD) and evapotranspiration were studied. The major findings were: (1) a strong mean VPD gradient exists coincident with the southern portion of the ecotone; (2) days having the strongest VPD gradients across the southern U.S. had 500 mb flow patterns similar to the modal 500 mb pattern; (3) drought years during the 1970's did not experience an increased frequency of the modal 500 mb pattern, but did experience increased frequency of the second most frequent pattern; drought years of the 1950's were associated with greater frequency of the modal 500 mb pattern; (4) the T-mode principal components analysis was cumbersome to use with daily data; use of raw pressure height data rather than zonal anomaly value retained excess variance not contributed by wave forms in the 500 mb pressure field. Dissert. Abstr.

N82-17744*# City Univ. of New York, N. Y.
INVESTIGATION OF MODELS FOR LARGE SCALE METEOROLOGICAL PREDICTION EXPERIMENTS Final Report
Jerome Spar Jan. 1982 27 p refs
(Grant NGR-33-013-086)
(NASA-CR-168415) Avail: NTIS HC A03/MF A01 CSCL 04B

Long-range numerical prediction and climate simulation experiments with various global atmospheric general circulation models are reported. A chronological listing of the titles of all publications and technical reports already distributed is presented together with an account of the most recent reseach. Several reports on a series of perpetual January climate simulations with the GISS coarse mesh climate model are listed. A set of perpetual July climate simulations with the same model is presented and the results are described. T.M.

N82-17745# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SUBSYNOPTIC-SCALE BAROCLINIC INSTABILITY
Prakki Satyamurty, Vadlamudi BrahmanandaRao, and Antonio DivinoMoura Oct. 1981 37 p refs Submitted for publication
(INPE-2241-PRE/027) Avail: NTIS HC A03/MF A01

A linear stability of the basic states encountered in the vicinity of idealized weak thermal fronts is discussed. Vertical profiles of the basic zonal wind and potential temperature are taken to be of the hyperbolic tangent type. A Boussinesq primitive equation model with high resolution is used. Unstable modes of intermediate scales are generated when the curvature of the basic flow in the lower levels is negative. Even if the curvature in the lower levels is positive, intermediate-scale unstable modes appear for smaller static stability and shear or for certain vertical distributions of diabatic heating due to the liberation of latent heat in the lower troposphere. The amplitude of the most unstable intermediate-scale wave is confined to the lower troposphere and its growth rate increases with inclusion of diabatic heating. T.M.

N82-17746# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE SEVERITY OF THE BRAZILIAN FREEZE OF JULY 1981, AS MONITORED BY SATELLITE
Michael Allan Fortune Sep. 1981 20 p refs
(INPE-2231-RPE/399) Avail: NTIS HC A02/MF A01

The location and intensity of freezing temperature during very cold nights ('geadas') in Brazil is discussed using satellite infrared television image data. The data are needed to lay the groundwork for a short-term freeze forecast model, which is to be developed before winter 1982. A cold snap occurred on 20-22 July 1981, which destroyed a large part of the future coffee, sugar and other harvest is documented. The photographs of enhanced satellite images document the widespread occurrence of subfreezing temperature in the states of Parana, Sao Paulo, Mato Grosso do Sul, and Minas Gerais. These sub-tropical areas are located north of the region which usually experiences frost, and thus damage to agriculture was particularly extensive. The synoptic factor responsible for the cold was a wandering cold-core cut-off low in the upper air, and not a strong cold front. The data contained in the photographs, when combined with the meteorological observations also presented will be valuable in developing a prediction model for the occurrence of 'geadas'. R.J.F.

N82-17747# World Meteorological Organization, Geneva (Switzerland).
PROCEEDINGS OF THE TECHNICAL CONFERENCE ON CLIMATE: ASIA AND WESTERN PACIFIC
1981 454 p refs Conf. held at Guangzhou, China, 15-20 Dec., 1980
(WMO-578; ISBN-92-63-10578-2) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The impact of the natural variability of climate on food production, availability of water and other vital resources is of increasing importance and needs to be considered in the planning and management of a wide range of activities. The acquisition of meteorological data, weather forecasting, the application of climatic data to agriculture, and the socio-economic impact of climate are discussed. For individual titles, see N82-17748 through N82-17783.

N82-17748# World Meteorological Organization, Geneva (Switzerland).
THE WORLD CLIMATE PROGRAM
Bo R. Doeoes *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 39 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFR 28

This program was established in order to improve the knowledge of climate and to apply this knowledge in the planning and coordination of related activities. The extent to which climate can be predicted and man's influence on it are investigated. Methods for assessing climatic impact and the characteristics of human societies that make them especially vulnerable or resilient to climatic factors are studied. Climatological networks and the development of an international data system, which includes satellite and ground based observations is discussed. S.L.

N82-17749# Bureau of Meteorology, Melbourne (Australia).
DEVELOPMENT OF A GLOBAL SYSTEM FOR ACQUIRING AND PROCESSING CLIMATOLOGICAL DATA
D. H. Lee *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 43-69 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFR 28

The type of data which is emphasized is what is referred to as basic long term data. That is data which are essential for the determination of the climate of a place or region. Other uses of this class of data are to assess the probability of occurrence of a specific element within a specific range of values - leading to risk assessment; or for assessing the degree of abnormality of a specific occurrence. It is essential that such basic long term data be recorded over a long period of time with homogeneous methods of observation and sampling. A global system for acquiring and processing climatological information requires that each nation provide such basic long term data. The data has to be of an acceptable level of quality and efficiently standardized so as to allow comparisons between locations in different countries. S.L.

N82-17750# Indian Meteorological Dept., New Delhi.
CLIMATIC DATA OF ASIA AND WESTERN PACIFIC, ITS AVAILABILITY, NETWORK, AND APPLICATIONS
R. P. Sarker *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 70-84 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Climate data are being preserved with sufficient care by countries in Asia and the Western Pacific. A number of climatic publications are being brought out by these countries for users. Manual methods of data scrutiny and quality control, etc., are being followed in most of these countries. The climatic data is being put to various well known applications in government organizations, public and private industry, research establishments, etc. S.L.

N82-17751# Meteorological Satellite Center, Tokyo (Japan).
METEOROLOGICAL PRODUCTS AND SOME APPLICATIONS OF GLOBAL METEOROLOGICAL SATELLITE (GMS) DATA
Seiichi Hatsukoto *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 85-104 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The role of satellite derived data is important for climate studies and it is required to improve its accuracy. Satellite derived and ship observed sea surface temperature data were compared and the results are presented. The water content in the air column has a large influence on estimates of the sea surface temperature, therefore, some improvements are introduced empirically for precipitable water. The resulting root mean square difference decreased considerably, to less than 1.5 C. Concerning the accuracy of wind vector estimation, various kinds of error sources are considered. Among them the assignment of wind level seems to have a critical effect. Satellite cloud wind estimate and rawinsonde measurements are compared and the results are summarized. S.L.

N82-17752# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.
A SYSTEM FOR CROP/CLIMATE ASSESSMENT USING METEOROLOGICAL AND SATELLITE DATA
Augustine Y. M. Yao *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 105-126 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

A system of crop assessment using meteorological and satellite information is discussed. The suitability of a crop to climatic environment is analyzed, alternative crops are suggested, and methods of weather modification that reduce hazards and minimize yield losses should adverse weather occur are recommended. This methodology uses near real time meteorological and satellite information to assess crop growth. The assessment provides not only useful warnings for decision makers should adverse weather occur, but also is used with crop yield models to make necessary adjustments to model estimates. Meteorological and agricultural information is used to construct models that estimate crop yield. S.L.

N82-17753# Pakistan Meteorological Dept., Karachi.
METEOROLOGICAL EVALUATION OF WIND ENERGY POTENTIAL IN THE COASTAL BELT OF PAKISTAN
Muhammad Rahmatullah and Qazi Waliullan *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 127-138 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Recent improvements in windmill design and the automatic arrangement for the use of a rotor to turn at a low chosen wind speed requires a reappraisal of wind power potential particularly in the coastal belt of Pakistan. Wind data is analyzed to determine the prevailing wind duration within various ranges of speeds at these stations. S.L.

N82-17754# National Oceanic and Atmospheric Administration, Princeton, N. J. Geophysical Fluid Dynamics Lab.
CLIMATE MODELING
J. Smagorinsky *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 139-151 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

There is a practical end in calibrating both the real atmosphere and models. A knowledge of the natural variability is essential to estimating the sampling error when selecting a single year: for the real atmosphere this shows up, for example, in designing an observational program. For models, this shows up in comparing a single year's simulation to a long term climatological average. In trying to detect a small long term trend from observational data, it is necessary to determine if that signal is significantly large compared to the noise of natural interannual variability. Conversely, in conducting model sensitivity studies, such as a CO2 perturbation experiment, it is necessary to determine if the signal to noise ratio is sufficiently large for valid conclusions. The signal and noise levels differ for different geographical locations and with season. S.L.

N82-17755# Japan Meteorological Agency, Tokyo.
PRESENT STATUS OF LONG-RANGE WEATHER FORECASTING
Yukio Kikuchi *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 152-166 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The status of the operational implementation of long range forecasting, the current techniques and research on long range forecasting and the accuracy of operational long range forecasts are presented. The techniques are classified into the empirical method and the dynamical method. Furthermore, the empirical method is classified into the analogue method, the correlation method and the periodic extrapolation method, are described. S.L.

N82-17756# Indian Inst. of Tech., New Delhi.
TROPICAL EASTERLY JET AND CONTRIBUTION OF INTERACTING ATMOSPHERIC WAVES IN MONSOON REGION
M. P. Singh, R. K. Datta (Indian Meteorological Dept., New Delhi), and R. C. Raghava *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 167-177 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The easterly jet stream is classified into two categories. One is the type of jet stream which is sporadic in nature and occurs anywhere over the globe in the southern periphery of an anticyclone. Occassionally, during southward motion a westerly jet stream of temperature zone splits and one branch travels along the periphery of a dynamic anticyclone as northerly or northeasterly current. One flow pattern depicts a strong easterly jet associated with the establishment of a block. The flow pattern exhibiting this feature is presented. Because of the sporadic nature of this type of jet stream, they cancel out (in the mean) and,

therefore, are not obviously reflected in mean conditions anywhere over the globe except that they appear only for a few days with fluctuating locations. S.L.

N82-17757# Canadian Climate Centre (Ontario).
THE NATURE AND SCOPE OF CLIMATE APPLICATIONS
Morley K. Thomas *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 178-186 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

'Climate applications' is defined as the knowledge of how to apply climate information for the use of mankind as an aid in solving social, economic and environmental problems. The general term 'climate applications' includes both consultative and operational activities. Archived historical and statistical climate data are used in consultation work to aid in planning where capital investment and other long term considerations are involved. Climate applications consists of more than simply the provision of climate data and information. Much consultation is usually required between the climatologist and the potential user to obtain an understanding of the relationships between climate and the various socio-economic and environmental sectors. S.L.

N82-17758# United Nations Educational, Scientific and Cultural Organization, Paris (France).
CLIMATE, CLIMATE DATA, AND WATER RESOURCES
James L. Irish *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 187-198 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The trends and developments in the field of climate and water resources are emphasized. Water resources development is seen throughout Asia as an integral part of social and economic development. Alternatives are generally evaluated, often in a benefit cost framework, but also in the context of environmental impact and social consequences. National objectives have generally stressed a more equitable distribution of the fruits of development - not only in terms of income, but also improved access to wealth and education services. This trend is welcomed, in the orientation of financial and technical assistance given to developing countries. S.L.

N82-17759# Food and Agriculture Organization of the United Nations, Rome (Italy).
CLIMATE APPLICATIONS TO AGRICULTURAL PROBLEMS
G. F. Popov *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 199-204 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An operational method which utilizes climatic and meteorological information for agrometeorological crop monitoring and forecasting is discussed. It is designed in such a way that it provides a first qualitative monitoring of crop conditions and allows preparation of quantitative yield assessments utilizing information from an agroclimatic data bank. The applications of the method to the following areas is discussed: (1) problems related to water (drainage, irrigation, fisheries); (2) forestry problems; (3) energy sources for agriculture; (4) analysis of past climatic data; and (5) forecasting situations influencing agricultural production and food procurement. Rainfall is cited as the single most important parameter to be considered in gathering present and future agrometeorological information. M.D.K.

N82-17760# New England Univ., Armidale (Australia). Agricultural Economics.
METEOROLOGICAL SERVICES IN AGRONOMIC AND ECONOMIC EVALUATIONS OF RISK
Jock R. Anderson *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 205-209 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Methods appropriate for reviewing new agronomic techniques are explored. The perspective is policy-oriented, towards enhancing the economic efficiency of agriculture. The focus is on the contribution to the process of evaluation that can and probably should be made by meteorology and meteorological services. Crop growth models, methods for evaluating risk in new cropping techniques, are discussed. Options for evaluation of agronomic techniques, utilizing meteorological data, are reviewed. The necessity for economic allocation for meteorological stations and the need for establishing a coarse grid of stations for enhanced economy in collection and related data processing are addressed. M.D.K.

N82-17761# Shanghai Meteorological Inst. (China).
THE STABILITY OF YIELDS IN SHANGHAI AND THE CLIMATIC CONDITIONS
Jiang De-long and Gao Shi-xiu *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 210-216 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The effect of climatic conditions on agricultural yields in Shanghai is discussed in the context of agricultural meteorology. The stability of agricultural yields is reported in terms of climatic anomalies, interannual variations in climate, unfavorable climatic conditions in the critical growing season, and agricultural innovations necessary to account for climatic variability. Data on climatic trends is presented and considered in terms of tentative trend forecasts. M.D.K.

N82-17762# United Nations Research Inst. for Social Development, Geneva (Switzerland).
FOOD CRISES AND FAMINES: THE UNRISD FOOD SYSTEMS APPROACH
P. Spitz *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 217-226 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An enquiry into food-climate interactions was made. The relationships between society and nature food and climate were considered. The extreme case of famines and food crises triggered by climatic fluctuation was chosen as a starting point. A Food Systems approach was formulated and applied not only to countries which still have to face periodic dramatic food situation, but also to countries which have succeeded in eliminating these crises. The Food Systems approach is discussed in terms of: seasonal variations, urban versus rural circumstances, the transfer of resources, and the present state of knowledge about food crises and famines. Increased climatic knowledge is suggested as a means for the reduction of food systems vulnerability. M.D.K.

N82-17763# Stockholm Univ. (Sweden). Dept. of Meteorology.
INCREASE OF ATMOSPHERIC CO2 AND POSSIBLE CLIMATIC CHANGES
Bert Bolin *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 227-238 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Numerous surveys of man's impact on climate, particularly the possible effects of an increasing concentration of atmospheric CO2 were made. A brief account summarizing the state of knowledge in this regard is made. Consideration is given to: (1) the characteristics of the carbon cycle and its response to man-made emissions to the atmosphere; (2) the climatic change that may be induced by an increasing amount of CO2 in the atmosphere; and (3) the likely developments over the next 50 years as a result of man's increasing exploitation of the global resources of fossil fuels and the terrestrial ecosystems. Analysis of the way in which the carbon cycle responds to disturbances due to man, i.e., fossil fuel combustion, deforestation and expansion of agriculture is considered to be of particular importance. M.D.K.

N82-17764# Leeds Univ. (England). School of Geography.
ENERGY AND CLIMATE IN SOUTH-EAST ASIA AND THE WESTERN PACIFIC

G. J. Lockwood *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 239-263 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Regional and global aspects of energy use were reviewed. The combined results of population increases, changing patterns of population densities, and escalating per capita energy consumption has concentrated in some regions of the world very large energy fluxes per unit area (energy flux density) when compared with the world average; consequences are considered. Climate is discussed as related to increasing energy use in three major areas: (1) climate as an energy source; (2) pollution of the atmosphere by energy use (waste heat and aerosols); and (3) climatic controls on energy use and the effects of climatic variations. Long term climatic changes and the attendant economic consequences of increased atmospheric carbon dioxide are discussed. Utilization of wind, water, and solar power as climate related energy sources is also considered. M.D.K.

N82-17765# National Oceanic and Atmospheric Administration, Rockville, Md. National Climate Program Office.
APPLICATIONS OF CLIMATE INFORMATION AND THE UNITED STATES NATIONAL CLIMATE PROGRAM
Edward S. Epstein *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 264-266 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The United States National Climate Program established with the purpose of assisting the Nation and the world to understand and respond to natural and man-induced climate processes and their implications is discussed. The basic strategy of the program is to emphasize early production of useful data and information based on existing knowledge of climate, while simultaneously expanding understanding of climate and its impacts on society. Three areas discussed in which progress should be made are: (1) understanding climate; (2) responding to impacts and policy implications of climate; and (3) providing climate products. The generation, dissemination and application of climate information and the creation and utilization of national data inventory and clearinghouse is also discussed. A summation of current activity areas within the program is presented. M.D.K.

N82-17766# World Meteorological Organization, Geneva (Switzerland).
STUDY OF CLIMATE AND ITS APPLIED ASPECTS
E. P. Borisenkov (USSR) and N. V. Kobysheva (USSR) *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 267-273 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The need for a reliable scientific basis for estimating the climate effect on the economic, biological and social aspects of society is considered. The foundation of this basis should include: knowledge of the general statistical characteristics of climate and its changeability for different regions and the whole globe and the methods for their consideration when forming a long-term plan of production development; and knowledge of the effect of climatic extremes on different aspects of economic and social life. The effect of climatic change on agriculture, on agricultural energy consumption, energy production, water resource management, and consequences of climatic variations on fish industry and human health is discussed. Methods for optimal consideration of future climate in planning man's economic activities are also discussed. M.D.K.

N82-17767# All-Union Research Inst. of Agricultural Meteorology, Moscow (USSR).
THE PROVISION OF CLIMATIC INFORMATION FOR AGRICULTURE IN THE USSR
Y. A. Khvalensky *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 274-277 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Examples of the adverse effects of climatic variability on agricultural productivity and practices are discussed. The vulnerability of agriculture to unfavorable climatic variations may be decreased by taking into account agroclimatic peculiarities of different territories. Examples of agroclimatic reference materials used for hydrometeorological support of agriculturists and for solution of practical problems in agricultural production are cited and discussed as means of decreasing agricultural vulnerability. M.D.K.

N82-17768# Central Meteorological Service, Peking (China).
ON POSSIBLE IMPACTS OF CLIMATIC VARIATIONS ON AGRICULTURE IN CHINA
Zhang Jia-cheng *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 278-288 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The impacts of climatic variation on agriculture which are significant in China are discussed. The impacts increase with their time scales and amplitudes. These impacts are discussed. The present state of agroclimate and the amplitudes of unit climatic variation and its impacts on agriculture are outlined. M.D.K.

N82-17769# Hydrometeorological Centre of the USSR (Moscow).
CLIMATE CIRCULATION PROCESSES IN SOUTH-EAST ASIA DURING WINTER MONSOON
B. S. Chuchalov *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 289-301 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

In South-East Asia the principal features of weather and climate variations are associated with seasonal migrations of the subtropical anticyclone belt in the northern and southern hemispheres, of the ITCZ zones in both hemispheres and also with the migration of extra-tropical frontal zones. Some elements of circulation processes which are needed to assess the distribution of and changes in climate conditions over South-East Asia are reviewed. Basic processes governing these climate dynamics are discussed. M.D.K.

N82-17770# World Meteorological Organization, Geneva (Switzerland).
THE NATURE OF DROUGHT AND STRATEGIES TO REDUCE ITS EFFECTS
W. J. Gibbs *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 302-315 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Areas in which water availability is critical and drought has a major impact are considered. These include hydroelectric and other forms of power generation, manufacturing industries, large urban communities, crop yields, and the condition and number of livestock. Four aspects of the subject examined in detail are: (1) the nature of drought, (2) frequency distributions and probability of rainfall, (3) drought impacts, and (4) strategies to reduce drought impacts. The manner in which man uses available water together with the occurrence of severe rainfall deficiencies and attendant social and economic repercussions are considered. M.D.K.

N82-17771# Andhra Univ., Waltair (India). Dept. of Meteorology and Oceanography
THE SUMMER MONSOON RAINS OVER SOUTH AND EAST ASIA AND WEST PACIFIC
I. Subbaramayya, O. S. R. U. BhanuKumar, and S. V. Babu *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 316-333 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

A comprehensive review, intended to focus attention on some important aspects of the summer monsoon rains, is presented. Studies regarding the atmospheric circulation change in the troposphere in relation to the advance of the monsoon over India are described. Advance of the monsoon in relation to the surface circulation changes, in particular the ITCZ, as a case study during MONEX period is presented. N.W.

N82-17772# Academy of Science of Water Conservancy and Electric Power, Beijing (China).

ANALYSIS OF DROUGHT OCCURRENCE AND LONG-TERM VARIATION OF ANNUAL STREAMFLOW IN EASTERN REGIONS OF CHINA

Chen Jiaqi and Shen Zhenrong *IN* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 339-340 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Deficiencies of monthly rainfall at several raingauge stations are shown. A drought day is defined in the sense of agricultural production, when the soil moisture content begins with less than the required moisture for the main vegetation in certain districts. Historical accounts covering nearly 400 years were analyzed. Several regions of drought are evident. Successive water shortage periods, reflected in annual streamflow of large rivers, is found. N.W.

N82-17773# World Meteorological Organization, Geneva (Switzerland).

CLIMATIC CHANGE AND SOCIAL DISTURBANCE

Koichiro Takahasni *In its* Tech. Conf. on Climate: Asia and Western Pacific 1981 p 341-349 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The relationship between climate and society is analyzed statistically and objectively by expressing climatic change and social disturbance in terms of certain indices. Single decade mean values of middle latitude temperatures are estimated based on actual observations for recent years and on tree ring widths and historical records of famines, ice conditions, freezing, etc., for ancient periods. Social disturbances are calculated, assuming within stated limits that the relative length of historical descriptions is a measure of social upheaval. These values are then analyzed to determine the relationship between geomagnetic disturbances and air pressure. N.W.

N82-17774# National Center for Atmospheric Research, Boulder, Colo. Environmental and Societal Impacts Group.

YAKIMA (WASHINGTON) STREAMFLOW FORECAST STUDY: THE IMPACT OF AN ERRONEOUS FORECAST

Michael H. Glantz *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 350-359 (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An erroneous streamflow forecast in which the water supply was underestimated by 50% is discussed. Benefits gained each year from 'accurate' forecasts, results suggest, might easily be overshadowed by just one erroneous forecast. Forecasters had balanced out 'return flow' with some relatively minor allocation to other irrigation projects. When they divided the available water supply based on their model outputs they did not take return flow into account as part of the water supply available for the allocation. N.W.

N82-17775# Kyoto Univ. (Japan). Inst. of Geophysics.

CHANGE OF GLOBAL CLIMATE DURING RECENT 100 YEARS

Ryozaburo Yamamoto *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 360-375 refs Sponsored by Japanese Ministry of Education (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The Northern Hemisphere mean surface air temperature of the past 100 years (including errors) is analyzed. The 30 year mean shows a warming from the late 19th century to the decade of the 1940s, and thereafter a cooling, starting about 1940. Confirmation of the cooling effects of volcanic eruptions is attempted, utilizing the year to year changes of the Northern Hemisphere mean temperature. Computation of volcanic loading in the stratosphere is made for the past 100 years. N.W.

N82-17776# Beijing Univ. (China). Dept. of Geophysics.

FURTHER STUDIES ON THE CLIMATIC CHANGE DURING HISTORICAL TIMES IN CHINA

Wang Shao-wu, Zhang Pei-yuan (Academia Sinica, China), and Zhang De-er (Central Meteorological Service) *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 376-393 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

An understanding of climatic change is one of the central issues society must address. It is important to reconstruct past climate, because estimating future climate must be based upon understanding of the past. Methods used in reconstructing past climate vary with the interested time scale. Based on numerous historical material, a consistent picture of the main outline of climatic variations in China during the past 5000 years is mentioned. In China, many records about natural calamities and agricultural damages have been kept in historical writings and voluminous local historical books. Recently meteorological and scientific research institutes and universities co-operated in a systematic compilation of the vast amount of climatic material in literature written in the last 500 years. Consequently, the annual distribution maps of dryness and wetness since 1470 were constructed and a winter temperature index series has been obtained. These have made it possible to take a closer view of climatic variations during recent centuries. N.W.

N82-17777# Tsukuba Univ. (Japan). Inst. of Geoscience.

REGIONALITY OF CLIMATIC CHANGE IN MONSOON ASIA

Masatoshi M. Yoshino and Kazuko Urushibara (Ashikaga Inst. of Technology, Japan) *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 394-410 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Regional differences in climatic changes are of importance to establish the counter-measure for damage by anomalous climate on agricultural production. It is not unusual to suffer floods in some regions and droughts in the nearby regions at the same time. This paper deals mainly with the regionality of climatic changes in East Asia during the recent years, using the year climate method expressed by the Koppen's system of climatic classification. Occurrence frequencies of year climate during the last 100 years were calculated for the four stations: Hong Kong, Manila, Shanghai and Tokyo. The results were compared with the distribution types of winter temperature and summer precipitation in China. A schema of the regionality of climatic fluctuation in East and Southeast Asia was given in relation to the upper-air streams. N.W.

N82-17778# United Nations Educational, Scientific and Cultural Organization, Paris (France). Intergovernmental Oceanographic Commission.

LARGE-SCALE OCEANOGRAPHIC VARIATIONS IN THE WESTERN NORTH PACIFIC

Koichi Nagasaka *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 411-418 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Long-term variations of the oceanographic conditions in the western equatorial Pacific are presented based upon the data obtained from the repeated hydrographic observations along the meridian at 137 deg E. Some of their effects on atmospheric events in the western Pacific area are discussed. N.W.

N82-17779# Hydrometeorological Centre of the USSR (Moscow).

OCEAN'S ROLE IN PROCESSES OF SHORT-RANGE CLIMATIC VARIATION FORMATION

S. A. Musaelyan *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 419-427 refs (For primary document see N82-17747 08-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Contributions of initial data and external energy sources to the numerical weather prediction over various time scales are examined, along with the oceanic heat memory and the oceanic cloud cover. The results cited show that there exists a close negative asynchronous relationship between the summer

anomalies in cloudiness over the North Atlantic and the deviations from the normal winter air temperatures over the European area of the U.S.S.R. This means that the heat absorbed and accumulated by the oceanic active layer during the warm half-year is conserved in the depths of the ocean for a long time and is given back to the atmosphere in winter months. J.M.S.

N82-17780# AARI, Leningrad (USSR).
OCEAN INFLUENCE ON CLIMATE FORMATION AND CHANGES
A. I. Voskresensky and Y. V. Nikolayev *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 428-432 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The role of the ocean in climate formation is addressed with emphasis on solar heat accumulation and ocean currents. Differences in the thermal regime of the ocean surface in comparison to the atmosphere and land, the transport of heat to high latitudes, and hypotheses concerning the causes of climatic variations and the role of the ocean in those variations are discussed. J.M.S.

N82-17781# Kyoto Univ. (Japan). Centre for Southeast Asian Studies.
THE IMPACTS OF CLIMATIC CHANGE ON HUMAN SOCIETY
Shinichi Ichimura *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 433-438 refs (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The interrelationships between climatic conditions and human socio-economic activities are examined. A schematic presentation is given of the effects of climatic variations in temperature, wind, precipitation, and ecological balance. Primary effects are observed in four fields of human activity: agriculture, industry, household, and society. Secondary effects, or the response to climatic variations are shown to be more serious than the primary effects. These secondary effects include development patterns, demographic mobility, socio-political effects, and international relations. Emphasis is given to agricultural production and socio-political impacts and international relations. J.M.S.

N82-17782# ESCAP, Bangkok (Thailand).
EFFECT OF CLIMATE ON THE DEVELOPMENT OF NATURAL RESOURCES IN ASIA
B. X. Zhang *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 439-445 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

Since climate is considered to be a consequence of average values in the basic meteorological elements of temperature, moisture, wind, pressure, and evaporation, these average values are used to develop a general criterion for use in planning and managing the development of natural resources. Emphasis is placed on early recognition that an abnormal climatic cycle may be developing and an accurate weather forecast to pinpoint the location and geographic extent of the disaster. The interrelationships between climate and development are addressed in the following areas: human resources, animal and range resources, agricultural resources, forest resources, fishery resources, water resources, mineral resources, and energy resources. J.M.S.

N82-17783# Clark Univ., Worcester, Mass. Center of Technology, Environment and Development.
IMPROVING THE SCIENCE OF CLIMATE IMPACT STUDY
Robert W. Kates *In* WMO Tech. Conf. on Climate: Asia and Western Pacific 1981 p 446-449 (For primary document see N82-17747 08-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 28

The interrelationships between climate, nature, and society are explored. Models of the interrelationships are discussed and the elements of study are described. These elements include: climate events, the identification of targets or receptors of impacts and exposure, the type of impacts or consequences to be considered, and the extent of their propagation through human socio-economic and political systems. Emphasis is placed on application of climatic data to productive human activity and to the mitigation of hazardous events. J.M.S.

N82-17784# Meteorology Research, Inc., Altadena, Calif.
NATURAL AND HISS CLOUD DROPLET DATA AS SAMPLED DURING THE 1980 - 1981 AEFA/SAINT PAUL FIELD PROGRAM Final Report, Jan. - Mar. 1981
M. E. Humbert, L. D. Dzamba, and S. M. Callander Sep. 1981 197 p refs
(Contract DAAK51-81-C-0005; DA Proj. 1L2-63209-D-103)
(AD-A107577; MRI-81-FR-1813) Avail: NTIS HC A09/MF A01 CSCL 04/2

During the months of January, February, and March 1981, the US Army Aviation Engineering Flight Activity (AEFA) conducted natural and artificial icing tests in the vicinity of St. Paul, Minnesota. The natural events involved exposure of a fully instrumented JUH-IH 'Huey' and a UH-60A 'Black Hawk' helicopter to extended periods of flight in supercooled stratiform clouds. The artificial portion of the testing required the same aircraft to fly in the cloud produced by the helicopter icing spray system (HISS) aboard a CH-47C 'Chinook' helicopter. The tanker cloud was sampled at various water flow rates, air speeds, humidities and temperatures. During the test period, each sampling helicopter was equipped with droplet sizing instrumentation. GRA

N82-17785# TRW Defense and Space Systems Group, Redondo Beach, Calif. Engineering Sciences Lab.
ANALYTIC MODELING OF SEVERE VORTICAL STORMS Final Report, 9 Jul. 1980 - 31 Dec. 1981
George Carrier, Francis E. Fendell, and Phillip Feldman Oct. 1981 58 p refs
(Contract N00014-79-C-0508)
(AD-A107706; TRW-35524-6002-UT-00) Avail: NTIS HC A04/MF A01 CSCL 04/2

The analytic modeling of well-organized rotating convective storms is invoked to elucidate the evolution from a moderately intense one-cell vortex, characterized by low-level pressure deficits on the order of one percent of atmospheric pressure, to a very intense two-cell vortex, characterized by low-level pressure deficits on the order of ten percent of atmospheric pressure. The physical distinction between the two stages rests on the insertion of a dry, compressionally heated, nonrotating, central downdraft of originally tropopause-level air in the transition to the more severe case. The quasisteady nature description of the thermohydrodynamic structure of each vortex is being developed, and then the conditions for transition from the moderately intense to the very intense vortex will be sought. The practical motivation is to make progress toward the highly desirable, but very formidable task of being able to anticipate which tropical storms or minimal hurricanes will evolve to supertyphoons. With a description of the one-cell storm, believed adequate for present purposes, already available, description of the two-cell vortex is the current challenge. GRA

N82-17786# Naval Environmental Prediction Research Facility, Monterey, Calif.
A VERIFICATION STUDY OF THE IMPROVED REGIONAL RAPID ANALOG SYSTEM (IRRAS) Final Report
L. Robin Brody Sep. 1981 54 p
(W0513CC0)
(AD-A107647; NEPRF-TR-81-05) Avail: NTIS HC A04/MF A01 CSCL 04/2

An analog system designed to make midrange regionalized forecasts is described. The analog system uses a unique historical data base which has been formulated to reduce data handling while speeding up analog matching procedures. Tuning and verification of the system are carried out for the Greater Mediterranean region. Verification results indicate that this analog system does not perform significantly better than either persistence type forecasting or forecasts produced by the current operational FNOC (Fleet Numerical Oceanography Center) analog. Possible causes for these results are discussed. Included as an appendix is a discussion of an analog-matching technique which, using the same unique historical data base, is designed to estimate

the current meteorological conditions for any possible silent data area. An experiment is described which tests the adequacy of this data base to produce matching analogs for a region covering the western U.S.S.R. Results indicate that there will have to be a substantial improvement in the historical data base if acceptable analogs are to be found. Author (GRA)

N82-17787# Aircraft Research and Development Unit, Edinburg (Australia).

MEAN ATMOSPHERIC CONDITIONS: AUSTRALIAN TROPICAL OPERATING CONDITIONS

G. Gartrell Oct. 1981 12 p refs

(AD-A107904; ARDU-TN-Aero-72; AR-002-477) Avail: NTIS HC A02/MF A01 CSCL 04/2

The ARDU mean tropical atmosphere differs significantly from the ICAO standard atmosphere and is based upon data gathered prior to 1965. More recent data have been considered in a reassessment of the validity of the ARDU atmosphere. The new data support the retention of both the ARDU tropical atmosphere and the ICAO atmosphere to describe mean conditions in their respective regions of application. It is recommended, however, that where extreme operating conditions for the Australian region are required, reference should be made to DEF(AUST) 5168 Part II Air Operations. Author (GRA)

N82-17788# Alfa Sierra Urfysik, Darmstadt (West Germany).

THE EXPLANATION OF BALL LIGHTNING [DIE ERKLAERUNG DES KUGELBLITZES]

Alfred Seeger 1 May 1981 9 p In GERMAN

Avail: NTIS HC A02/MF A01

The phenomenon and origins of ball lightning are examined. Ball lightning is an electrically activated minitornado and its interference with spacecraft and aeronautics is discussed. The thermal explosions of the conduit, the skin effect and the electric repulsion of equal charges, causes the electrical storm to separate into a nuclear storm which is carried by the heavy and positive ion atoms, and a convection current carried by the lighter negative electrons. Through rolling friction with the surrounding air, a minitornado like a ball lightning has considerable momentum, which finally absorbs its energy content. Because of the greater friction with the faster medium like air, the ball lightning moves preferably along extensive walls, until it finally replaces sizes, corners and peaks like a soap bubble with mostly absorbed energy. Transl. by E.A.K.

N82-17789# Danish Meteorological Inst., Copenhagen. Dept. for Climatology.

A STATISTICAL ANALYSIS OF MONTHLY PRECIPITATION IN DENMARK

Peter Allerup 1981 33 p refs

(DMI-CLIMATOL-PAPERS-7; ISBN-87-7478-100-1) Avail: NTIS HC A03/MF A01

Data from 44 weather stations are analyzed in an attempt to establish a statistical model which explains monthly precipitation variation throughout the country, and the variation of the precipitation in one place studied over a period of time. No comprehensive explanation is found, but the use of a normal distribution model for residual variation reveals a series of structural facts e.g., a simple additive structure in the log values, stating that the expected logarithmic precipitation at a station can be calculated as a sum of a site specific parameter and a time specific parameter which is different for different months.

Author (ESA)

N82-17790# World Meteorological Organization, Geneva (Switzerland).

WORLD WEATHER WATCH TROPICAL CYCLONE PROGRAM. TYPHOON OPERATIONAL EXPERIMENT (TOPEX): AUTOMATIC WEATHER STATIONS FOR TROPICAL CYCLONE AREAS

1981 73 p

(WMO-570; ISBN-92-63-10570-1) Avail: NTIS MF A01; print copy available at WMO, Geneva

Design and operation details necessary for developing countries with suitable sites for automatic weather stations in order to obtain data for tropical cyclone detection and warning are presented. Assessment of various surface meteorological parameters for tropical cyclone monitoring is explained. Selection of sensors, associated components, and automatic weather station platforms is discussed. Automatic data transmission and remote display are covered. Utilization of satellites for data collection and transmission is also considered. Data recording and quality control objectives are mentioned. Classification procedures, supervision and systems improvement are described.

Author (ESA)

N82-17791# Minority Services, Inc., Washington, D.C.

PUBLIC REQUIREMENTS FOR WEATHER INFORMATION AND ATTITUDES CONCERNING WEATHER SERVICE

Joel M. Reaser Jun. 1981 133 p

(Grant NA80SA-C-00654)

(PB82-109117; NOAA-81081302) Avail: NTIS HC A07/MF A01 CSCL 04B

Public requirements for weather information was determined. The purpose of the project is to improve services. The data were collected by a telephone interview survey of a statistically representative sample of some 1300 respondents throughout the country interviewed between September 23 and October 7, 1980. GRA

N82-17792# National Oceanic and Atmospheric Administration, Washington, D. C. National Earth Satellite Service.

PUBLICATIONS AND REPORTS ON CONTRACTS AND GRANTS, 1980 Final Report

Nancy A. Everson May 1981 19 p refs

(PB82-103219; NOAA-TM-NESS-115; NOAA-81072202) Avail: NTIS HC A02/MF A01 CSCL 04B

This bibliography cites the titles and authors of 122 articles and reports published by or for the National Earth Satellite Service (NESS). The first section includes publications by NESS staff members and the second section includes final reports on contracts and grants sponsored by NESS. GRA

N82-17793# Atmospheric Turbulence and Diffusion Lab., Oak Ridge, Tenn. Air Resources Labs.

AN ANALYSIS OF WANGARA MICROMETEOROLOGY: SURFACE STRESS, SENSIBLE HEAT, EVAPORATION, AND DEWFALL

B. B. Hicks Jun. 1981 43 p refs Sponsored by NOAA

(PB82-114190; NOAA-TM-ERL-ARL-104; NOAA-81081902) Avail: NTIS HC A03/MF A01 CSCL 04B

Eddy fluxes and gradients for the Wangara experiment and earlier investigation of flux gradient relations used to derive values of the sensible heat flux and friction velocity appropriate to the general area of the Wangara experiment rather than to the considerably smoother central site were reported. Friction velocities appear to be considerably greater than those developed in previous studies of the Wangara data set. Sensible heat fluxes are similar during daytime, but differ greatly from other estimates for night. Dewfall evaluations indicate a total of about 9 mm during the experiment; condensation occurred at the theoretical maximum rate of about 0.07 mm/hr. Maximum dewfall occurred under clear skies and in moderate winds. GRA

N82-17794# National Severe Storms Lab., Norman, Okla.

MULTIPLE DOPPLER RADAR ANALYSIS OF SEVERE THUNDERSTORMS: DESIGNING A GENERAL ANALYSIS SYSTEM

R. A. Brown, C. R. Safford, S. P. Nelson, D. W Burgess, W. C. Bumgarner, M. L. Weible, and L. C. Fortner Jun. 1981 34 p refs Sponsored by NOAA, DOE, FAA and Nuclear Regulatory Commission

(PB82-114117; NOAA-TM-ERL-NSSL-92; NOAA-81081905) Avail: NTIS HC A03/MF A01 CSCL 04B

Synthesis and analysis of data acquired by multiple Doppler radars proceed in stages of editing, data interpolation to grid points, synthesis of data for definition of three dimensional flow, calculation of kinematic parameters, and display of analyzed data. The procedure for designing such an analysis system is described in the report. GRA

N82-17795# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.

METEOROLOGICAL SETTINGS ASSOCIATED WITH SIGNIFICANT CONVECTIVE STORMS IN COLORADO

R. A. Maddox, D. M. Rodgers, W. Deitrich, and D. L. Bartels

Jun. 1981 85 p refs
(PB82-106238; NOAA-TM-ERL-OWRM-4) Avail: NTIS HC A05/MF A01 CSCL 04B

A climatology of Colorado severe convective storms, those that produce damaging hail, damaging winds, tornadoes or flash floods, was developed. It is shown that Colorado's severe storm season occurs considerably later in the year than it does in the central and eastern United States. The meteorological settings that lead to severe storms are reviewed and a number of recent significant events are analyzed. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-17796 Wisconsin Univ. - Madison.
THE CHARACTERIZATION AND EVOLUTION OF CARBONATE TIDAL DELTAS, UPPER FLORIDA KEYS Ph.D. Thesis
David Samuel Charlton 1981 421 p
Avail: Univ. Microfilms Order No. 8117507

South Florida was inundated by the last sea-level rise, initiating tidal exchange between Florida Bay and the open ocean at bedrock lows along the Florida Keys. Carbonate tidal deltas, composed of mangrove peat and carbonate sediments, formed during the last 5000 years seaward and bayward of tidal channels at Snake Creek, Whale Harbor and Tavernier Creek. The carbonate tidal delta system at Snake Creek is emphasized. Six surface depositional zones of the Snake Creek bayside delta and diagnostic elements recognized in cores, representing environmental gradients from most restricted circulation to more open marine conditions are discussed. Dissert. Abstr.

N82-17797 California Univ., San Diego.
TIDAL VARIABILITY IN THE CURRENT AND TEMPERATURE FIELDS ON THE SOUTHERN CALIFORNIA CONTINENTAL SHELF Ph.D. Thesis
Alan Wayne Bratkovich 1981 129 p
Avail: Univ. Microfilms Order No. 8125436

Observations were analyzed in the tidal frequency band (.6-6 cpd). The seasonal variability of the temperature and horizontal velocity component fields for this frequency band is characterized both in terms of mean variance statistics and changes in the power spectra. Energetic tidal peaks were observed centered at frequencies of 1, 2, 3 and 4 cpd which are cuspate in appearance. The bandwidth of the peaks is approximately 0.2 cpd. Spatial patterns in the velocity and temperature fields vary in amplitude and phase over vertical and horizontal spatial scales comparable to the local depth and shelf width respectively. The vertically averaged cross shelf mass transport associated with semidiurnal and diurnal cross shelf currents is sufficient to sustain tidal sea surface elevation changes. The total cross shelf mass exchange is found to be about three times larger than the net mass flux at tidal frequencies. Dissert. Abstr.

N82-17798*# Old Dominion Univ., Norfolk, Va. Dept. of Oceanography.
THE RELATIONSHIP AMONG SEA SURFACE ROUGHNESS VARIATIONS, OCEANOGRAPHIC ANALYSES, AND AIRBORNE REMOTE SENSING ANALYSES Final Report, 16 May - 31 Oct. 1981
George F. Oertel and Terry L. Wade Dec. 1981 252 p refs (Grant NAG1-189)
(NASA-CR-168444; TR-81-2) Avail: NTIS HC A12/MF A01 CSCL 08C

The synthetic aperture radar (SAR) was studied to determine whether it could image large scale estuaries and oceanic features such as fronts and to explain the electromagnetic interaction between SAR and the individual surface front features. Fronts were observed to occur at the entrance to the Chesapeake Bay. The airborne measurements consisted of data collection by SAR onboard an F-4 aircraft and real aperture side looking radar (SLAR) in Mohawk aircraft. A total of 89 transects were flown. Surface roughness and color as well as temperature and salinity were evaluated. Cross-frontal surveys were made. Frontal shear and convergence flow were obtained. Surface active organic materials, it was indicated, are present at the air-sea interface. In all, 2000 analyses were conducted to characterize the spatial and temporal variabilities associated with water mass boundaries. N.W.

N82-17799*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SENSITIVITY OF A CLIMATOLOGICALLY-DRIVEN SEA ICE MODEL TO THE OCEAN HEAT FLUX
Claire L. Parkinson and Michael R. Good Jan. 1982 34 p refs
(NASA-TM-83877) Avail: NTIS HC A03/MF A01 CSCL 08L

Ocean heat flux sensitivity was studied on a numerical model of sea ice covering the Weddell Sea region of the southern ocean. The model is driven by mean monthly climatological atmospheric variables. For each model run, the ocean heat flux is uniform in both space and time. Ocean heat fluxes below 20 W m to the minus 2 power do not provide sufficient energy to allow the ice to melt to its summertime thicknesses and concentrations by the end of the 14 month simulation, whereas ocean heat fluxes of 30 W m to the minus 2 power and above result in too much ice melt, producing the almost total disappearance of ice in the Weddell Sea by the end of the 14 months. These results are dependent on the atmospheric forcing fields. E.A.K.

N82-17800# Naval Oceanographic Office, Bay St. Louis, Miss.
VARIATIONS IN THE THERMAL STRUCTURE AND WIND FIELD OCCURRING IN THE WESTERN INDIAN OCEAN DURING THE MONSOONS Technical Report, Oct. 1975 - Dec. 1979
John G. Bruce Aug. 1981 177 p refs
(Contracts N00014-74-C-0262; N00014-79-C-0262; Grant NSF ATM-74-2226; NR Proj. 083-004)
(AD-A107761; NOO-TR-272) Avail: NTIS HC A09/MF A01 CSCL 08/3

The changes occurring in the temperature field in the Somali Basin and off the Arabian coast were monitored by a time series of temperature sections obtained along the tanker sea lane offshore. The development and decay of the large eddy (up to roughly 600 km in diameter) and its smaller associated eddies were observed each southwest monsoon. Strong horizontal thermal gradients particularly in the upper 200 m occurred at the eddy boundaries; currents in this region can attain velocities up to 7 knots. Monthly wind stress clearly shows the southwest monsoon from May through September to be considerably stronger than the northeast monsoon with maximum in January. Maps of wind stress curl during the southwest monsoon show a large region of negative curl to the northeast off the Somali coast, whereas a region of a high positive curl occurs off the Arabian peninsula and in a small band off the Somali east coast north of 5 N. Sverdrup mass transports of up to 40 x 10 to the -12th g/sec to the north off the Somali coast are in rough agreement with observed values. GRA

N82-17801# Naval Research Lab., Washington, D. C.
UNDERWATER FLOW VISUALIZATION METHODS IN THE UPPER LAYER OF THE OCEAN Interim Report
J. R. McGrath, C. M. Gordon, D. Greenwalt, A. Schuetz, M. Long, and C. F. Dohne (Science Applications, Inc., McLean, Va.) 22 May 1981 67 p refs
(RR0310441)
(AD-A107919; NRL-MR-4509) Avail: NTIS HC A04/MF A01 CSCL 08/3

A unique approach to measuring shear in the ocean has been developed. The approach involves dye tracing to determine the presence and location of shear in water velocity profiles and underwater photography as the data acquisition technique. Subsequent application of photogrammetric techniques is shown to be feasible and puts the observations on a quantitative footing. The advantage of underwater flow visualization over conventional (free-fall) shear measurements is that the result provides graphic evidence of fluid motion and its subsequent evolution. This approach should lend itself to both new and/or improved models of the upper ocean. Author (GRA)

N82-17802# European Space Agency, Paris (France).
SEA STATE MEASUREMENT WITH A TWO FREQUENCY SCATTEROMETER (THEORY)
Michael Kleintz Dec. 1981 177 p refs Transl. into ENGLISH of "Seegangsbestimmung mit dem Zweifrequenz-Scatterometer (Theoretische Grundlagen)" Rept. DFVLR-FB-80-32 Oberpfaffenhofen, West Germany, May 1980 Original report in GERMAN previously announced as N81-22675
(ESA-TT-710; DFVLR-FB-80-32) Avail: NTIS HC A09/MF A01; DFVLR, Cologne DM 31,20

In the context of the Spacelab program, sea state measurements with a two frequency scatterometer are considered. A system analysis of two frequency scatterometry, especially signal analysis for stationary and airborne (aircraft; satellite) measurements, is presented, and an unambiguous method for wind direction determination is given. A statistical model of sea state, based on the frequency spectrum of the water wave height distribution, is used. The radar echo from the sea surface is characterized for a monochromatic ouptut signal. An autocorrelation function is developed, and application in consideration of the Doppler spectrum of the sea surface reflectance function is shown. Author (ESA)

N82-17803# National Oceanic and Atmospheric Administration, Rockville, Md. Ocean Technology and Engineering Services.
ERROR ANALYSIS OF PULSE LOCATION ESTIMATES FOR SIMULATED BATHYMETRIC LIDAR RETURNS
Gary C. Guenther and Robert W. L. Thomas Jul. 1981 59 p refs Prepared in cooperation with EG and G Washington Analytical Services Center, Inc., Rockville, Md.
(PB82-109448; NOAA-TR-OTES-1; NOAA-81081101) Avail: NTIS HC A04/MF A01 CSCL 08J

A Poisson count simulator is used to generate precision and offset results for the estimated temporal location of quantum limited laser pulses. Pulse sizes, shapes, and charge integration times are varied over appropriate ranges. A number of location estimators including variations on peak, centroid, and threshold detectors are examined. Comparisons with experimental results are presented. Hardware and software design parameters of an airborne lidar hydrography system are discussed. GRA

N82-17804# Rhode Island Univ., Narragansett. School of Oceanography.
NEARSHORE MARINE TRACE METAL GEOCHEMISTRY Final Report
Michael L. Bender Aug. 1981 102 p refs
(Grant EPA-R-803243)
(PB82-109372; ERLN-X11; EPA-600/3-81-050) Avail: NTIS HC A06/MF A01 CSCL 08J

Aspect of the nearshore geochemistry of trace metals which give information on consequences of trace metal pollution attending nearshore waste disposal are summarized. The distribution of dissolved and particulate trace metals in the Hudson River Estuary; pore water nutrient, carbon and metal geochemistry in Narragansett Bay; trace metal adsorption in Narragansett Bay sediments; and benthic fluxes of transition metals out of Narragansett Bay sediments. GRA

N82-17805# National Bureau of Standards, Boulder, Colo. Wave Propagation Lab.
RECOVERING OCEAN WAVEHEIGHT FROM HF RADAR SEA ECHOES DISTORTED BY IMPERFECT IONOSPHERIC REFLECTION
T. M. Georges, J. W. Maresca, C. T. Carlson, J. P. Riley, R. M. Jones, and D. E. Westover May 1981 156 p refs
(PB82-113283; NOAA-TM-ERL-WPL-73; NOAA-81081901) Avail: NTIS HC A08/MF A01 CSCL 08C

A real-time signal processing package to collect high-quality sea-echo Doppler spectra under many different ionospheric conditions found in nature was developed. Graphical displays and objective quality indices help the radar operator sort undistorted spectra from those distorted by imperfect ionospheric reflection, so that ocean wave height can be reliably estimated while the data are being collected, The package can be used either off-line on archival data or for on-line adaptive processing of radar data as part of an ocean-scanning strategy.
Author (GRA)

N82-17806# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.
BRINE DISPOSAL IN THE GULF OF MEXICO: PROJECTED IMPACTS FOR WEST HACKBERRY BASED ON BRYAN MOUND EXPERIENCE
Jun. 1981 90 p refs
(PB82-109513; NOAA-81080702) Avail: NTIS HC A05/MF A01 CSCL 08A

Brine discharge into the Gulf of Mexico from the Strategic Petroleum Reserve West Hackberry facility, Cameron Parish, Louisiana is investigated in terms of its environmental effects. Projected impacts on brine disposal on the nearshore marine environment are presented because of post-discharge experience and knowledge gained from the Bryan Mound, Texas brine disposal site which has been operational for one year. Based on Bryan Mound discharge experience, brine disposal at West Hackberry is projected to have minimal impact on the biota and sediment and water quality. Author (GRA)

N82-17807# Office of Technology Assessment, Washington, D. C.
TECHNOLOGY AND OCEANOGRAPHY: AN ASSESSMENT OF FEDERAL TECHNOLOGIES FOR OCEANOGRAPHIC RESEARCH AND MONITORING
Jun. 1981 172 p refs
(PB82-101718; OTA-O-141; LC-81-600086) Avail: NTIS HC A08/MF A01 CSCL 08J

This report was intended to provide Congress with a useful structure to evaluate both ongoing ocean programs and new initiatives, especially those that involve costly and complex technologies. The assessments describes the status of technologies in use today, such as research ships, submersibles, buoy systems, aircraft, and satellites. It analyzes future problems and opportunities and examines the Federal agencies and programs charged with conducting oceanic studies and providing the necessary management and hardware systems. GRA

N82-17808 Columbia Univ., New York.
THE THERMO-MECHANICAL PROPERTIES OF THE OCEANIC LITHOSPHERE Ph.D. Thesis
John Howard Bodine 1981 338 p
Avail: Univ. Microfilms Order No. 8125251

The oceanic lithosphere is observed to have sufficient intrinsic strength to support the weight of large seamounts, undersea volcanoes, and oceanic islands for long periods of time. The support of these features appears to be accommodated by regional isostatic compensation related to flexure of the lithosphere. While the evidence for the flexure of the lithosphere can be successfully analyzed using a simple elastic plate model, rheological considerations and observations of flexure at some trenches indicate that an elastic processes play an important role in the response of the plate. Observations of the bending of the oceanic lithosphere may be compared to flexure predicted by a model of the lithosphere in which the rheology is determined from the results of experimental rock mechanics. Model results relate the mechanical properties of the oceanic lithosphere to the thermal structure of the lithosphere. Dissert. Abstr.

N82-17809 California Univ., San Diego.
AN ACTIVE SOURCE ELECTROMAGNETIC METHOD FOR PROBING THE EARTH'S ELECTRICAL CONDUCTIVITY STRUCTURE BENEATH THE OCEAN FLOOR Ph.D. Thesis
Peter David Young 1981 255 p
Avail: Univ. Microfilms Order No. 8125446

The electrical conductivity structure of the basement rocks in the area of the East Pacific Rise at 21 deg N latitude. The source was a length of cable, insulated except for bared ends, deployed on the sea floor and powered from shipboard; this antenna, once straightened and oriented by dragging on the bottom, formed an end grounded horizontal dipole source. Through this antenna were fed a number of different tailored waveforms, which between them gave transmissions at the frequencies 0.25 Hz, 0.50 Hz, 0.75 Hz, 1.50 Hz, and 2.25 Hz with roughly equal dipole strengths on the order of 25,000 ampere-meters. Results show conductivity roughly on the order of that of seawater immediately beneath the seafloor, and a fairly thick region with a conductivity less than .004 S/m no more than 1.5 kilometers

under the seafloor and falling below .001 S/m at depths on the order of 5 to 8 kilometers; for greater depths a reasonable interpretation of the inversion results on the basis of geophysical arguments gives a continued rise with increasing depth.
Dissert. Abstr.

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-17810 Rush Univ., Chicago, Ill.
SOME MECHANISMS OF CALCIUM TRANSPORT BY THE CARDIAC SARCOLEMMA Ph.D. Thesis
Ronald F. Ledvora 1981 80 p
Avail: Univ. Microfilms Order No. 8124733

Purified sarcolemmal membrane vesicles were prepared from frozen dog heart ventricles by a combination of differential and sucrose step gradient ultracentrifugation. The Ca ++ flux measurements were made using a rapid filtration technique. About 80 percent of the Ca(++) accumulated by Na(+)/Ca(++) exchange or Ca(++)/Ca(++) exchange could be released as free Ca(++), while up to 20 percent was probably bound. The mechanisms for Na(+)/Ca(++) exchange and Ca(++)/Ca(++) exchange are located in the sarcolemmal membrane of cardiac muscle cells. Both processes transport freely-exchangeable Ca(++) across the membrane. Electrogenic Na(+)/Ca(++) exchange may influence the excitability of the cardiac muscle cell. Both processes are probably carrier mediated transport mechanisms, although not by the same carrier. Both Na(+)/Ca(++) exchange and Ca(++)/Ca(+) exchange probably play important roles as Ca(++) homeostatic mechanisms in the cardiac muscle cell. Dissert. Abstr.

N82-17811 Illinois Univ. at Urbana-Champaign.
THE STRUCTURE AND FUNCTION OF CHLOROPHYLL-PROTEINS IN PHOTOSYSTEM 1 AND THE LIGHT HARVESTING COMPLEX OF PHOTOSYSTEM 2 Ph.D. Thesis
John Emerson Mullet 1980 150 p
Avail: Univ. Microfilms Order No. 8127654

The functional units of chloropiast membranes which mediate photosynthetic electron transport from water to NADP are structurally organized into integral complexes. Two of these membrane-bound complexes, Photosystem I (PSI) and Photosystem II (PS II), consist in part of chlorophyll proteins. Photosystem I complexes were isolated by a technique which allowed purification of PSI which retained characteristics attributed to PS I in vivo. The purified PS I complexes were further fractionated by detergent treatment and PS I complexes which were depleted of chlorophyll proteins were isolated. The major chlorophyll-protein of chloroplast membranes which is structurally organizing into light harvesting complexes associated with PS II was isolated and characterized and its role in thylakoid adhesion tested. The chlorophyll-protein complex, termed LHC-II, were incorporated into lipid vesicles; this preparation was used to demonstrate the involvement of LHC-II in cross-membrane adhesion between thylakoid membranes. Dissert. Absrt.

N82-17812# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOL. 15, NO. 5, SEP. - OCT. 1981
O. G. Gazenko, ed 2 Nov. 1981 146 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981
(JPRS-79346) Avail: NTIS HC A07/MF A01

The varied effects of space flight factors on the human body are addressed. Results of simulation studies as well as data gathered in-flight are presented. Experimental studies performed on rats flown onboard various Cosmos satellites are also included. For individual titles, see N82-17813 through N82-17838.

N82-17813# Joint Publications Research Service, Arlington, Va.
IN-FLIGHT DIETS AND QUANTITATIVE ADEQUACY THEREOF TO PILOT EXPENDITURE c54
I. G. Popov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 1-13 refs Transl. into English from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 4-14 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Nutrition of aircraft crews in prolonged flights is discussed. Meal arrangements in flights of up to 4 hours, physiological-hygienic requirements to flight diets and, on this basis, possible improvement of crew nutrition through a better utilization of meals on the ground are addressed. The Soviet and foreign data on pilot energy expenditures and caloric value of diets in flights over 4 hours are reviewed with emphasis on potential development of excessive food intake with symptoms of acute overeating in prolonged flights. J.M.S.

N82-17814# Joint Publications Research Service, Arlington, Va.
EFFECT OF STATIONARY MAGNETIC FIELD ON THE ENDOCRINE SYSTEM c52
Ye. A. Zagorskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 14-20 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 14-17 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

It is indicated that endocrine glands react to the constant magnetic field (CMF). The phasic pattern of the hypophyseal-adrenal reaction and GMF effects on the sympathoadrenal system and thyroid are discussed. The potential therapeutic applications of the CMF is addressed with emphasis on the fact that most morphological data available need biochemical support. J.M.S.

N82-17815# Joint Publications Research Service, Arlington, Va.
DIET OF CREWS OF THREE MAIN EXPEDITIONS ABOARD SALYUT-6 ORBITAL STATION c54
V. P. Bychkov, S. Kalandarov, M. V. Markaryan, N. D. Radchenko, K. A. Stepchkov, and M. L. Frumkin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 21-25 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 17-20 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The advanced space diets of three prime crews who made 96-, 140- and 175-day flights aboard Salyut-6 are described. It is concluded that the diets facilitated maintenance of a good nutrient status, high work capacity and normal health condition. J.M.S.

N82-17816# Joint Publications Research Service, Arlington, Va.
AMINO ACID METABOLISM DURING PROLONGED INTAKE OF DEHYDRATED FOODS AND SIMULATION OF SOME SPACE FLIGHT FACTORS c52
V. P. Bychkov, I. I. Borodulina, and T. F. Vlasova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 26-29 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. Oct. 1981 p 21-23 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Forty-two healthy volunteers, aged 19 to 49, participated in three bed rest studies of 69 to 180 days in duration. The test subjects were kept on the diet consisting of dehydrated foods: fresh, stored for up to 2 years, and exposed to proton irradiation at a dose of 24,000 rad. Metabolism of amino acids was investigated under these conditions. It was concluded that during prolonged storage and irradiation proteins of dehydrated foods retained their biological value. This allows their use in long term space flights. Author

N82-17817# Joint Publications Research Service, Arlington, Va.
EFFECT OF SPACE FLIGHTS OF DIFFERENT DURATION ON ENERGY METABOLISM OF HUMAN ERYTHROCYTES c52
A. S. Ushakov, S. M. Ivanova, S. S. Brantova, and O. I. Labetskaya

In its USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 30-34 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 23-27 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The energy metabolism of red blood cells of cosmonauts was investigated before and after flights of varying duration. Certain changes in red blood metabolism were found after prolonged space flights. Author

N82-17818# Joint Publications Research Service, Arlington, Va.

PREVENTION OF STAPHYLOCOCCAL INFECTIONS DURING SPACE FLIGHTS **c52**

S. N. Zaloguyev, A. N. Viktorov, V. P. Gorshkov, T. Yu Norkina, and M. M. Shinkareva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 35-38 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 27-29 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The incidence of carriers of photogenic staphylococci among cosmonauts and candidates (applicants) for positions of crew members in spacecraft was investigated. The staphylococcal flora of carriers were assessed while they participate in space flights varying in duration. Samples of microflora were taken from people in their ordinary habitat by means of cotton swabs. To collect samples of miroflora from cosmonauts while in the cabin of a spacecraft, specially developed test tubes containing a preservative were used. The material was analyzed under laboratory conditions after delivering specimens to Earth. Pathogenic staphylococci (Staph. aureus) were identified by testing the capacity to decompose mannitol under anaerobic conditions, production of the enzymes, coagulase and lecithinase, as well as on the basis of presence and intensity of toxin production, in the isolated cultures. The strains of pathogenic staphylococci were submitted to phage typing using the international set of staphylococcal bacteriophages. J.M.S.

N82-17819# Joint Publications Research Service, Arlington, Va.

HUMAN ADRENOSYMPATHETIC SYSTEM DURING IMMERSION IN WATER **c52**

N. A. Davydova, R. A. Tigranyan, and Ye. B. Shulzhenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 39-44 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 30-34 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The activity of the sympathoadrenal system (SAS) of 12 volunteers exposed to water immersion for 7 days was studied. Before and after water immersion, six of the test subjects were exposed to acceleration of +3 Gz for 15 min. It was demonstrated that water immersion increased the hormonal activity and decreased the transmitter activity of the SAS. Exposure to acceleration stimulated the SAS, thus increasing immersion tolerance. Author

N82-17820# Joint Publications Research Service, Arlington, Va.

COMBINED EFFECT OF SIMULATED WEIGHTLESSNESS AND ACCELERATIONS ON ENERGY METABOLISM ENZYMES

Ye. G. Vetrova, T. Ye. Drozdova, R. A. Tigranyan, and Ye. B. Shulzhenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 45-49 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 34-38 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Exposure to simulated weightlessness (7 day water immersion and 7 day head-down tilt) caused a decrease in the activity of malate (MDH) and isocitrate dehydrogenase (ICDH), and creatine phosphokinase (CPK) at the expense of its MM isoform whereas the activity of alanine (ALT) and aspartate aminotransferase (AST) and pattern of distribution of MDH isoforms remained unchanged. Exposure to acceleration of +3 Gz before and after simulated weightlessness revealed similar changes in the activity of MDH, ICDH, ALT, AST and MDH cytoplasmic fractions. However, the higher increase in the enzyme activity after simulated weightlessness may give evidence for a greater change in cell membrane permeability during acceleration effects that followed simulated weightlessness. Author

N82-17821# Joint Publications Research Service, Arlington, Va.

CARDIAC OUTPUT AND CARDIAC CYCLE PHASE STRUCTURE OF PILOTS DURING FLIGHTS **c52**

V. A. Degtyarev, V. S. Bednenko, A. B. Vasilyev, A. N. Kozlov, V. Ya. Kolyagin, and A. P. Yarunin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 50-54 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 38-41 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Changes in cardiac output and systolic time intervals of pilots in-flight were examined by the Doppler ultrasound method. The changes were related to the degree of complexity of different flight stages. It is recommended that the above parameters be monitored during flight training in order to standardize professional loads. Author

N82-17822# Joint Publications Research Service, Arlington, Va.

HUMAN LIPID METABOLISM DURING CONFINEMENT IN PRESSURE CHAMBER **c52**

V. P. Bychkov and O. S. Khokhlova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 55-58 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 41-43 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The effect of prolonged enclosure, changed diet, atmosphere, and hypolinesia on lipid metabolism was investigated in 115 test subjects during 27 experimental runs. It was conducted that the changes in lipid metabolism occurred primarily due to reduced work load. Author

N82-17823# Joint Publications Research Service, Arlington, Va.

AEROSOLS DISTRIBUTION OF MICROORGANISMS IN A MANNED PRESSURIZED CHAMBER AND EFFECT OF ARTIFICIAL AIR IONIZATION **c45**

S. N. Zeloguyev, B. V. Anisimov, A. N. Viktorov, and V. P. Gorshkov *In its* USSR Rept.: Space Biol. and Aerospace Med., v. 15, no. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 59-62 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 44-46 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Male subjects spent 16 days in a pressure chamber 24 cu m in size. The parameters of microclimate, work and test schedule, food allowance and personal hygiene resources were kept in the range inherent in manned spacecraft cabins. The results indicate that a highly dispersed phase of bacterial aerosol, represented by microorganisms that are the most probable pathogens of diseases among crews of spacecraft, is formed in the air of an airtight compartment. Elevation of the level of bipolar air ionization is a factor which has an adverse effect on the intensity of transmission of conditionally pathogenic bacteria. These findings must be taken into consideration when working out the means of removing dust and microorganisms from the atmosphere of spacecraft cabins. J.M.S.

N82-17824# Joint Publications Research Service, Arlington, Va.

VITAMIN C, B SUB 1 AND B SUB 6 EXCRETION IN URINE DURING 182-DAY ANTIORTHOSTATIC HYPOKINESIA **c52**

V. P. Bychkov and V. A. Korshunova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 63-67 refs Transl. into ENGLISH

from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 46-49 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Renal excretion of ascorbic acid, thiamin, and 4-pyridoxic acid was studied in 18 test subjects exposed for 182 days to head-down tilt. Two groups of subjects (6 subjects in each) performed exercises of different work load and the third control group was exposed to hypokinesia as such. It is shown that exercises produced a beneficial effect on vitamin metabolism. It is recommended to develop preliminary adaptation to the work load planned as a countermeasure in real or simulated weightlessness. Author

N82-17825# Joint Publications Research Service, Arlington, Va.
JUGULAR, RIGHT ATRIAL PRESSURE AND CEREBRAL HEMODYNAMICS OF HEALTHY MAN SUBMITTED TO POSTURAL TESTS **c52**
V. Ye. Katkov, V. V. Chestukhin, V. V. Rumyantsev, A. Z. Troshin, and O. Kh. Zybin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 6873 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 49-53 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Ten test subjects were catheterized and exposed to head up and head down tilts at 10, 30, and 75 deg for 5 min each to measure blood pressure in the upper bulb of the internal jugular vein and right atrium. Blood acid base equilibrium, hemoglobin content, and oxygen saturation were also determined. In the head up position at 75 deg the jugular pressure decreased, remaining positive (2.8 mm Hg) in most cases, whereas the atrial pressure fell down to reach the subatmospheric level. In the head down position the jugular pressure increases in proportion to the tilt angle, amounting to 32.2 mm Hg at 75 deg the atrial pressure changed in a different fashion: in 7 cases it increased and in 3 cases decreased. Throughout the test the oxygen arteriovenous difference in the brain and the acid base equilibrium in the outflowing blood remained essentially unchanged. This reflects autoregulation of the cerebral blood flow and its adequacy to metabolic requirements. Author

N82-17826# Joint Publications Research Service, Arlington, Va.
EFFECTS OF EMBIENT PARAMETERS ON MAN **c52**
R. M. Arslanova, I. Ye. Ganelina, V. Ye. Manoylov, L. K. Sapozhkov, and S. K. Churina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 74-77 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 53-55 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The effects of meteogeophysical parameters on the incidence of cardiovascular disorders were studied. It is shown that geomagnetic activity has a negative effect on the incidence and that at certain seasons this effect is minimal. Author

N82-17827# Joint Publications Research Service, Arlington, Va.
ANTIHYPOXIC EFFICACY OF INTERMITTENT MODE OF PRESSURE CHAMBER CONDITIONING OF MAN **c52**
A. Yu. Katkov, Ye. A. Kovalenko, G. A. Davydov, R. N. Chabdarova, S. A. Vtoryy, A. P. Manik, Yu. A. Spasskiy, Yu. P. Starshinov, and N. M. Utkina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 78-81 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 56-58 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

It is shown that a 10-day altitude chamber training in an intermittent mode can increase the maximum altitude man tolerates from 8,400 to 9,500 m and maximum time of exposure to increasing hypoxia (from 5,000 m) from 37 to 49 min. The antihypoxic effect of the above training persists for 10 days after its completion, leading to a better oxygen supply to various tissues. Author

N82-17828# Joint Publications Research Service, Arlington, Va.
INFORMATIVENESS OF ULTRASONIC DOPPLER CARDIOGRAPHY IN EVALUATION OF CORONARY CIRCULATION **c52**
V. S. Bednenko, V. A. Degtyarev, A. N. Kozlov, N. N. Popov, and G. K. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-86 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 58-61 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The use of ultrasonic Doppler cardiography (with respect to the integral values of the signal at systole) to determine efficient coronary circulation was investigated in acute dog experiments (in comparison to the electromagnetic method) and in biophysical models. On the basis of the comparative studies it is concluded that ultrasonic Doppler cardiography can be applied to measure relative changes in the efficient coronary circulation. Author

N82-17829# Joint Publications Research Service, Arlington, Va.
AGE RELATED DISTINCTIONS OF COSMONAUTS REGIONAL HEMODYNAMICS **c52**
I. D. Vasilyeva, Kh. Kh. Yarullin, and V. I. Zhuyko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-90 ref Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 61-64 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Hemodynamics of the large hemispheres of the brain, vertebral basilar system, lungs and legs of 60 cosmonauts aged 30-37 and 38-47, were investigated rheographically. Measurements were made in the morning, under conditions of basal metabolism and in the daytime, before orthostatic tests. Comparison of hemodynamic parameters recorded in the morning and at the daytime and in the two age groups showed significant differences revealing the effects of different factors, first of all psychoemotional tension, on the vasomotor regulation, and greatest resistance of cerebral and pulmonary vascular systems of older cosmonauts to those effects. These investigations emphasize great importance of studies of regional hemodynamics, especially rheoencephalography, not only before provocative tests but also under conditions of basal metabolism. Author

N82-17830# Joint Publications Research Service, Arlington, Va.
COMPARATIVE EVALUATION OF ANTIMICROBIAL ACTIVITY OF SOME URINE PRESERVATIVES **c52**
T. Ye. Lebedeva, I. V. Yakimova, N. M. Nazarov, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 91-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 64-66 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Antiseptics were examined for their antimicrobial activity with respect to the microorganisms that are most likely to occur in the urine subject to prolonged storage. Chlorine and iodine containing compounds were found to have the highest antimicrobial activity combined with a wide spectrum of antimicrobial action. The antimicrobial effect of these compounds was mostly expressed in regard to the typical representatives of urobacteria that actively hydrolyze urea to yield ammonia during prolonged storage of urine. Author

N82-17831# Joint Publications Research Service, Arlington, Va.
RAT AMINO ACID COMPOSITION AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE
T. F. Vlasova, Ye. B. Miroshnikova, T. A. Smirnova, and I. A. Dmitriyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 95-97 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 66-68 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

Data concerning the amino acid pool of rats flown onboard Cosmos-1129 and exposed to the ground based synchronous experiment are presented. Certain changes in the amino acid pool of flight and synchronous rats were found. The changes seem to be associated with the selective rate of incorporation of free amino acids into the biosynthetic processes during acute adaptation and with alterations in the protein synthesis rate.
J.M.S.

N82-17832# Joint Publications Research Service, Arlington, Va.

MYOCARDIAL PROTEIN FRACTIONS AND ENZYMATIC ACTIVITY THEREOF IN EXPERIMENTAL RATS FLOWN ABOARD COSMOS-936 BIOSATELLITE

R. A. Tigranyan, Ye. A. Nosova, Ye. V. Kolchina, N. A. Veresotskaya, L. M. Kurkina, and N. S. Kolganova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 98-102 refs Transl. into ENGLISH fom Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 68-71 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

The effect of artificial gravity on protein fractions and their enzyme activity in the myocardium of rats flown onboard Cosmos-936 was studied. In weightless rats the content of sarcoplasmatic proteins increased at R + 0 and that of T fraction proteins decreased at R + 25. In centrifuged rats such changes were not seen. In centrifuged rats the enzyme activity of sarcoplasmatic proteins did not alter. In weightless rats ATPase activity of myosin decreased significantly, and in centrifuged rats it remained almost unchanged. Author

N82-17833# Joint Publications Research Service, Arlington, Va.

METABOLIC PROCESSIS IN RAT SKELETAL MUSCLES AFTER FLIGHT ABOARD COSMOS-936

Ye A. Nosova, N. A. Veresotskaya, Ye. V. Kolchina, L. M. Kurkina, R. A. Belitskaya, and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 103-107 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 71-75 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

The study of skeletal muscles of rats flown on Cosmos-936 demonstrated different metabolic reactions in muscle fibers of different function and type to weightlessness and Earth gravity. The data obtained gave evidence that artificial gravity may considerably prevent metabolic changes in muscles developing in response to specific effects of weightlessness. Author

N82-17834# Joint Publications Research Service, Arlington, Va.

ACTIVITY OF SOME ENZYMES OF CARBONHYDRATE METABOLISM IN RAT SKELETAL MUSCLES AFTER SPACE FLIGHT

V. P. Nesterov, N. A. Veresotskaya, and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 p 108-112 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 75-78 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

Space flight factors did not influence activity of glycogen phosphorylase and adenylate cyclase in skeletal muscles of rats. Activity of glucose-6-phosphate and 6-phosphogluconate dehydrogenases increased noticeably in the most active muscles (gastrocnemius and tibialis anterior muscles). Activation of enzymes involved in the pentosephosphate pathway of glucose conversion may be associated with compensatory processes induced by muscle changes due to diminished motor activity of animals in space flight. Author

N82-17835# Joint Publications Research Service, Arlington, Va.

ULTRASTRUCTURE OF BLOOD VESSELS AND MUSCLE FIBERS OF RAT SKELETAL MUSCLES AFTER FLIGHTS ABOARD COSMOS-605 AND COSMOS-782 BIOSATELLITES

Z. F. Davik and K. D. Rokhlenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 113-118 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 78-83 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

Electron microscopy was used to study ultrastructures of the wall of blood vessels and muscle fibers of the red (soleus) and mixed gastrocnemius) muscles of rats flown on Cosmos 605 for 22.5 days and on Cosmos 782 for 19.5 days and sacrificed 4 to 6 hours, 48 hours and 25 to 27 days postflight. It was demonstrated that the orbital flight did not induce significant changes in the ultrastructure of blood vessels of the soleus and gastrocnemius muscles but caused atrophy of muscle fibers and reduction of the number of functioning capillaries. Readaptation of the soleus vascular system to 1 g led to degradation of permeability of capillary and venular walls and development of edema of the perivascular connective tissue. This may be one of the factors responsible for dystrophic changes in muscle fibers. Author

N82-17836# Joint Publications Research Service, Arlington, Va.

BLOOD FIBRINOGEN AS RELATED TO IMMERSION IN WATER FOR SEVEN DAYS AND SHORT-TERM SPACE FLIGHT **c52**

A. N. Fomin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 119-122 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 83-85 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

A scrutiny of the literature dealing with hemocoagulation under hypokinetic conditions revealed that blood fibrinogen was studied exclusively in conjunction with other parameters characterizing the blood clotting system. Increase in fibrinogen concentration in blood was demonstrated in individuals submitted to prolonged hypokinesia, patients restricted to bed rest and animals used in experiments with hypokinesia. Blood tests were made on six healthy men before, during, and after seven days of immersion in water as well as cosmonauts before and after seven and four day flights. The microtechnique for measuring the concentration of fibrinogen in blood is based on the phenomenon of heat denaturation of this protein at a temperature of 56 C. Results indicate that the fibrinogen increased during the four to six days of the study. J.M.S.

N82-17837# Joint Publications Research Service, Arlington, Va.

METHOD OF ASSESSING INDIVIDUAL RESISTANCE OF RATS TO HYPOXIC HYPOXIA

Yu. V. Farber, A. Yu. Grigoryev, and A. I. Yelfimov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 123-125 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 85-86 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

The question of screening experimental animals according to resistance to hypoxia is addressed in view of the need to investigate individual distinctions with regard to resistance to the body to various extreme factors, including a shortage of oxygen. There are some methodological approaches to the study of this question. In particular, one determines coefficient K as the ratio of rat survival time at an altitude of 12,000 m to restitution time. Experimental data on individual reactions to acute hypoxic hypoxia, which are obtained by determining the time of retention of the postural reflex with a static load are presented.
J.M.S.

N82-17838# Joint Publications Research Service, Arlington, Va.

ASSAY OF DISSOLVED CARBON IN RECLAIMED WATER PRODUCED IN SPACECRAFT WATER SUPPLY SYSTEMS **c25**

Yu. S. Koloskova, Z. P. Pak, and S. V. Chizhov *In its* USSR

Rept.: Space Biol. and Aerospace med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 126-129 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 87-89 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

The method of assaying total, organic and inorganic carbon based on infrared spectroscopy into the practice of monitoring and checking the quality of reclaimed potable water is described. The results of measuring total, organic and inorganic carbon in samples of reclaimed water obtained by physicochemical methods from various moisture-containing waste by means of an analyzer of total carbon content are presented. J.M.S.

N82-17839# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF HOMING PIGEONS IN BRAZIL: SOME PRELIMINARY RESULTS
R. Ranvaud Oct. 1981 16 p refs Presented at Intern. Symp. on Avian Navigation, Tirrenia, Italy, 14-18 Sep. 1981
(INPE-2248-PRE/032) Avail: NTIS HC A02/MF A01

Observations of vanishing bearings are described. The ability of pigeons to home quite well under some rather unfavorable conditions, namely with the Sun not too far from the zenith and under total overcast in relatively weakly inclined magnetic fields, as well as in cases where the inclination of the magnetic field actually reverses during the flight home is discussed. Homing in regions where the apparent diurnal motion of the Sun's azimuth reverses during the year, the midday Sun being to the north in June and to the south in December, is reported. Homing right across the so called south atlantic anomaly, at which the principal component of the Earth's magnetic field has an absolute minimum, providing a situation in which the gradient of total intensity is zero in all directions, is also reported. T.M.

N82-17840# Litton Bionetics, Inc., Kensington, Md.
MAMMALIAN TOXICOLOGICAL EVALUATION OF DIMP AND DCPD (PHASE 3 - IMPA) Final Report, Dec. 1976 - Apr. 1980
Francis J. Mecler May 1981 277 p
(Contract DAMD17-77-C-7003; DA Proj. 3E1-62720-A-835)
(AD-A107574) Avail: NTIS HC A13/MF A01 CSCL 06/20

IMPA (Isopropyl Methylphosphonic Acid) had oral LD50's of 7650 and 6070 mg/kg in male and female rats, respectively, and of 5620 and 6550 mg/kg in male and female mice. It was not irritant to rabbit eyes. It was mildly irritant to rabbit skin but produced no systemic toxicity at a dose of 2 mg/kg. IMPA did not induce dermal sensitization in guinea pigs. No evidence of toxicity followed administration of IMPA in the drinking water at levels up to 3000 ppm to rats for 90 days. IMPA was not mutagenic to five strains of Salmonella indicator organisms in the Ames assay both with and without rat liver activation. GRA

N82-17841# California Univ., Irvine, Dayton, Ohio.
RESPIRATORY TOXICOLOGY, 1981 Annual Technical Report, Jun. 1980 - May 1981
Paul E. Newton Wright-Patterson AFB, Ohio AFAMRL Aug. 1981 45 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107672; AFAMRL-TR-81-81) Avail: NTIS HC A03/MF A01 CSCL 06/20

The Respiratory Toxicology research programs conducted at the Toxic Hazards Research Unit (THRU), Wright-Patterson Air Force Base by the University of California, Irvine are reviewed in this annual report. Preliminary results are presented of studies concerning: (1) the effect of propylene glycol dinitrate on the cardiovascular system in the dog; (2) the evaluation of pulmonary clearance after exposure to 1.2 ppm of ozone, and (3) the evaluation of small airway test sensitivity in enzyme induced emphysema. Author (GRA)

N82-17842# California Univ., Irvine. Dept. of Community and Environmental Medicine.
COMPARATIVE BIOCHEMISTRY AND METABOLISM. PART 2: NAPHTHALENE LUNG TOXICITY Annual Report, Jun. 1980 - May 1981
Alan R. Buckpitt Wright-Patterson AFB, Ohio Aerospace Medical Research Labs. Oct. 1981 43 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107673; AFAMRL-TR-81-84) Avail: NTIS HC A03/MF A01 CSCL 06/20

Earlier studies have shown that intraperitoneal administration of naphthalene causes selective pulmonary bronchiolar necrosis in mice and have suggested a role for reactive naphthalene metabolites in the tissue damage. These studies have been extended to show that covalent binding of reactive naphthalene metabolites to tissue macromolecules in lung, liver and kidney is dose-dependent. High levels of covalent binding occur only after tissue glutathione levels are depleted substantially and only at doses of 200 mg/kg and above. The 200 mg/kg dose is the lowest dose at which lung lesions are observed. Piperonyl butoxide pretreatment decreases pulmonary damage and covalent binding and partially blocks glutathione depletion by 400 mg/kg naphthalene. In comparison, SKF 525 A pretreatment decreased covalent binding levels to a much smaller extent and failed to alter glutathione depletion or pulmonary damage after 400 mg/kg naphthalene. When compared to vehicle pretreated controls, phenobarbital or 3-methylcholanthrene pretreatment produced no change in the severity of lung damage after doses of naphthalene ranging from 50 to 400 mg/kg nor did these inducers alter covalent binding at doses of naphthalene of 200 mg/kg or less. Pretreatment of mice with p-xylene preferentially inactivated pulmonary cytochrome p450 and blocked naphthalene induced lung damage but failed to selectively decrease covalent binding of reactive metabolites in the lung. Current studies are continuing to examine the role of cytochrome P450 dependent metabolic activation of naphthalene in the lung in the bronchiolar damage. Author (GRA)

N82-17843# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Abt. Angewandte Physik.
BIOPHYSICAL FUNDAMENTALS AND INSTRUMENTATION FOR THE ENDOVESICAL Nd:YAG-LASER APPLICATION
T. Halldorsson 5 Jun. 1981 25 p refs In GERMAN; ENGLISH summary
(MBB-UA-581-81-O) Avail: NTIS HC A02/MF A01

The laser irradiation power needed for tumor therapy was investigated. From considerations of the absorptivity of cellwater and blood as well as the multiple scattering of the radiation and heat conduction in tissue, a theoretical model was developed which enabled an accurate calculation of the temperature distribution up to the denaturation point as well as the percentage of the radiation power lost through backward and forward scattering of light. The theoretical calculations were experimentally verified in animal experiments and measurements on specimens of human bladder tissue performed with a thermocamera. According to the requirements of endoscopic laser therapy, a medical Nd:YAG laser system was developed. For the beam transport into the urinary bladder, flexible light pipes made from thin quartz fibers were used. A.R.H.

N82-17844# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 4
4 Jan. 1982 62 p refs Transl. into ENGLISH of various Russian articles
(JPRS-79780) Copyright. Avail: Issuing Activity

The effects of nonionizing electromagnetic radiation on organisms and tissues are discussed. For individual titles, see N82-17845 through N82-17853.

N82-17845# Joint Publications Research Service, Arlington, Va.
EFFECT OF COMMERCIAL FREQUENCY ELECTROMAGNETIC FIELD ON ANDROGEN FUNCTION OF RAT TESTS
A. G. Reznikov and L. V. Tarasenko *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 1-5 refs Transl. into ENGLISH from Fiz. Zh. (USSR), v. 27, no. 1, Jan. - Feb. 1981 p 121-124 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

The biological effects of commercial frequency electromagnetic fields (CFEMF) generated by high voltage electric power lines on the gonads of male rats were investigated. The effect of CFEMF on the endocrine function of rat tests consists of an

intensification of steroidogenetic processes and a corresponding increase in the activity of the steroid delta(5)-3 beta-o1 dehydrogenase. No appreciable changes in testosterone levels in peripheral blood plasma were observed following CFEMF irradiation for a period of four months. J.D.H.

N82-17846# Joint Publications Research Service, Arlington, Va.

FEATURES OF METABOLIC DISTURBANCES IN RAT MYOCARDIUM UNDER EFFECT OF ALTERNATING MAGNETIC FIELDS OF DIFFERENT PARAMETERS

F. A. Kolodub, O. N. Chernysheva, and G. I. Yevtushenko *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 6-10 refs Transl. into ENGLISH from Kardiologiya (USSR), v. 21, no. 4, Apr. 1981 p 82-85 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The effect of alternating magnetic fields of various voltages and exposures on the metabolism of carbohydrates, macroergic phosphates, and low molecular nitrogen compounds in the rat heart was investigated. The direction and degree of metabolic disturbances in the myocardium after exposure to industrial frequency alternating magnetic fields depend on the voltage of the field and the length of exposure. An alternating magnetic field with a voltage of 32 kA/m delays oxidation and phosphorylation processes without affecting their coupling, and the proportion of oxidized carbohydrates increases as compared with fatty acids. The conversion of carbohydrates and of nitrogen substances are stimulated by an alternating magnetic field with a voltage of 7.5 kA/m. J.D.H.

N82-17847# Joint Publications Research Service, Arlington, Va.

INFLUENCE OF ELECTROMAGNETIC WAVES IN MILLIMETER BAND ON INDUCTOPROTEIN SYNTHESIS OF PENICILLINASE BY STAPHYLOCOCCUS AUREUS

A. Z. Smolyanskaya, A. M. Makhov, E. A. Gelvich, and M. B. Golant *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 11-16 refs Transl. into ENGLISH from Biol. Nauki (USSR), no. 5, May 1981 p 24-28 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The effect of electromagnetic waves in the millimeter band on the synthesis and activity of pencillinase produced by strains of Staphylococcus aureus and Escherichia coli is examined. Experiments demonstrated that wave lengths of 6,478 and 6,468 mm inhibit the induction of the enzyme by St. aureus. However, this type of radiation does not affect the activity of the exoenzyme released from the St. aureus strain, and also does not affect the constitutive synthesis of the penicillinase by E. coli. The relationship of effect of the duration of irradiation, bacterial population, and the strength of current density is elucidated. Author

N82-17848# Joint Publications Research Service, Arlington, Va.

PHYSICAL FACTORS OF ENVIRONMENT AS HYGIENE PROBLEM **c45**

M. G. Shandala *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 17-26 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 1, Jan. 1981 p 9-16 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The direction of scientific research into the effect of physical factors influenced by industrial and technical development on the environment is surveyed. Physical factors considered are mechanical, thermal, optical, electrical, magnetic, electromagnetic and ionizing radiation. Findings on the effect of these factors on environmental hygiene are reviewed. J.D.H.

N82-17849# Joint Publications Research Service, Arlington, Va.

EFFECTS ON BIOLOGICAL SYSTEMS OF ELECTROMAGNETIC OSCILLATIONS IN MILLIMETER RANGE OF WAVELENGTHS

N. D. Devyatkov, O. V. Betskiy, E. A. Gelvich, M. B. Golant, A. M. Makhov, T. B. Rebrova, L. A. Sevastyanova, and A. Z. Smolyanskaya *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 27-36 refs Transl. into ENGLISH from Radiobiol. (USSR), v. 21, no. 2, Mar. - Apr. 1981 p 163-171 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The main patterns of the effects of millimeter radiation of nonthermal intensity on various biological objects are discussed on the molecular, cellular levels, as well as on the level of complex living organisms. The main objects of the studies were hemoglobin and erythrocytes and human blood, E. coli, Staphylococcus aureus, Aspergilla mold, mice and rats. Author

N82-17850# Joint Publications Research Service, Arlington, Va.

CURRENT PROBLEMS OF RADIOBIOLOGY OF ELECTROMAGNETIC RADIATION OF RADIO-FREQUENCY RANGE **c52**

I. G. Akoyev *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 37-43 refs Transl. into ENGLISH from Radiobiol. (USSR), v. 20, no. 1, Jan. - Feb. 1980 p 3-8 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

On the basis of analysis of the current state of the radiobiology of nonionizing radiation, the need for accelerated development of basic research on the biological action of these radiations, especially in the radio-frequency range, is substantiated. An objective is set for accumulation of experimental data on questions of reversibility and cumulative effects, selectivity, specificity and additivity, direct and indirect action, sensitivity, adaptation and stability in regard to radiation, species differences, and possible mechanisms of operation of radiation. Author

N82-17851# Joint Publications Research Service, Arlington, Va.

PARTICULAR FEATURES OF CONDITIONED ELECTRODEFENSIVE REFLEX IN WHITE RATS ON BACKGROUND OF CONSTANT MAGNETIC FIELD

I. V. Shust, S. I. Galantyuk, and Yu. V. Cheretyanko *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 44-50 refs Transl. into ENGLISH from Fiz. Zh. (USSR), v. 26, no. 2, Mar. - Apr. 1980 p 264-268 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The formation of a conditioned electrodefensive reflex in white rats exposed to a 1,000 Oe constant magnetic field was investigated. The influence of the vitamin preparation galascorbin on the formation of the reflex was also studied. The tenacity of the conditioned reflex was reduced by exposure to the CMF, with a greater reduction observed in the initial phase of its development. Changes in conditioned reflex activity were observed during exposure and during the aftereffect period. The threshold of the avoidance reaction initially increased, then decreased, with normalization of the indicator observed until the end of the experiment. Administration of galascorbin promoted tenacious development of the conditioned reflex, which remained more pronounced in the CMF aftereffect period. J.D.H.

N82-17852# Joint Publications Research Service, Arlington, Va.

MORTALITY IN ACUTE MYOCARDIAL INFARCTION AS FUNCTION OF GEOMAGNETIC FIELD ACTIVITY IN YEREVAN **c52**

N. N. Karazyan and L. A. Akhverdyan *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 51-55 Transl. into ENGLISH from Dokl. Akad. Nauk Arm. SSR (USSR), v. 22, no. 3, 1981 p 188-191 (For primary document see N82-17844 08-51)

Avail: Issuing Activity

The medical history of patients who died from acute myocardial infarction in the city of Yerevan, Armenian SSR, during 1974-1978 was analyzed and compared with records of geomagnetic field activity. The basic causes of death from complications of myocardial infarction were also evaluated. A

direct connection was observed between the mortality rate and increased magnetic activity, with men exhibiting a greater sensitivity to high geomagnetic field activity than women. J.D.H.

N82-17853# Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPOGEOMAGNETIC FIELD ON ACTIVITY OF SOME CEREBRAL ENZYMES c52
A. V. Shakula and G. M. Chernyakov *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 56-59 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 9, Sep. 1981 p 11-13 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

The activity of key brain enzymes of rabbits whose embryonic and early postnatal development occurred during exposure to a hypogeomagnetic field was investigated. The activity of succinate dehydrogenase (SDH), glucose-6-phosphate dehydrogenase (G-6-PDH), tetrazolium oxyreductanse (NAD-H), and hexokinase (HK) as determined. Histological examination of neuronal bodies of the cortex, of astroglia and oligodendroglia revealed very high G-6-PDH and NAD-H activity, moderate SDH activity, and mild HK activity. A hypogeomagnetic field was found to be a biologically active factor having an adverse effect on the enzymes regulating energy metabolism. J.D.H.

N82-17854 Washington Univ., St. Louis, Mo.
MUSCLE, MOTOR CORTEX, CEREBELLAR NUCLEAR, AND SPINDLE AFFERENT DURING SLOW HOLD-RAMP-HOLD POSITION-TRACKING MOVEMENTS OF THE MONKEY'S WRIST Ph.D. Thesis
Marc Hudson Schieber 1982 469 p
Avail: Univ. Microfilms Order No. 8122756

Two Rhesus monkeys were trained to perform flexion and extension wrist movements guided by a tracking display. The monkey used a wrist position control to operate a cursor with which he pursued a visual target. The target, and therefore the monkey's wrist, moved in slow hold-ramp-hold (HRH) trajectories. By changing parameters of the target's trajectory, changes were produced in the parameters of the monkey's wrist movement. The second monkey was trained additionally to perform self-spaced alternating wrist movements and to receive occasional pulses of torque about the wrist. It is hypothesized that during slow HRH wrist movements, two parallel motor systems operated in relative dissociation. The first system included class I motor cortex neurons, alpha motoneurons, and extrafusal muscle. The second system included class II motor cortex neurons, nearly all related dentate and interposed neurons, gamma motoneurons, and spindle afferents. This system could have provided for the continuous acquisition of dynamically sensitive spindle afferent feedback constantly maintained in the face of widely varying peripheral conditions. Dissert. Abstr.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-17855 Minnesota Univ., Minneapolis.
FACILITATED DIFFUSION OF SMALL NON-ELECTROLYTES IN THE HUMAN RED BLOOD CELL
Robert Ray Mayrand 1981 136 p
Avail: Univ. Microfilms Order No. 8125991

The design of a new simple continuous flow system for the analysis of rates of permeation of small non-electrolytes across human red cell membranes is described. With this system it was demonstrated that ethylene glycol equilibrium exchange is saturable, KM = 175 mM, and inhibitable, glycerol K1 = 1200 mM. Ethylene glycol yielded a permeability coefficient of P sub s = .000336 cm/s. Urea equilibrium exchange was also examined with the continuous flow system. Saturation was again observed, KM = 218 mM. The maximal rate of urea exchange was P sub s = .000808 cm/s. The estimated non-inhibitable (presumably through the lipid) portion of urea equilibrium exchange was .0000258 cm/s which is 3.2 percent of the maximal rate. Dissert. Abstr.

N82-17856 Columbia Univ., New York.
TEMPORAL INTEGRATION OF ACOUSTIC POWER FOR INTERRUPTED STIMULI AT SUPRATHRESHOLD LEVELS Ph.D. Thesis
Joyce Rodriguez-Arrufat 1981 132 p
Avail: Univ. Microfilms Order No. 8125375

Threshold and suprathreshold temporal integration data employing experimental variables were investigated. Data were collected to experimental conditions: three stimulus types, nine signal durations and four presentation levels including threshold. Subjects were three normal hearing listener who participated in 20 practice sessions and 12 test sessions of 20 minutes each. Mean threshold and point of subjective equality (PSE) values were calculated for each subject and each experimental condition. It is indicated that the constants of the function are a product of the interaction between stimulus type and intensity as incorporated in a two part linear regression model. It is suggested that critical duration decreases with intensity and is essentially independent of stimulus type at 50 db and 80 dB SPL. The slope of the function varies as a function of intensity and stimulus type, being largest for 1000 Hz and smallest for white noise. These findings are discussed in terms of Zwislocki's exponential theory of loudness summation. Dissert. Abstr.

N82-17857 Ohio Univ., Athens.
QUANTIFICATION OF PSYCHOACOUSTIC TUNING CURVE SHARPNESS: AN ANALYSIS OF FREQUENCY RESOLUTION IN CHILDREN AND ADULTS Ph.D. Thesis
Neal Alan Sloane 1981 120 p
Avail: Univ. Microfilms Order No. 8126067

Probe tone frequencies were pulsed with a rise/fall time of 50 msec., duration of 400 msec., and were delivered at 10 dB SL using a simultaneous masking paradigm. Masked threshold was determined using a modified Hughson-Westlake technique. After the first set of tuning curves was obtained, each subject returned in 24 hours to replicate the test. Results show that the main effect for age is nonsignificant, the main effect for sessions also is nonsignificant, the main effect for frequency is significant, and all possible interactions are nonsignificant. A Tukey Test, calculated for the main effect of frequency, established that all three tuning curves differ significantly from one another in sharpness, it is concluded that within the age range under study, age does not influence tuning curve sharpness, d sub 1 oct. values do not change significantly across experimental sessions, and tuning curves increase significantly in sharpness across probe tone frequencies of 500, 1000, and 2000 Hz.
Dissert. Abstr.

N82-17858 Florida State Univ., Tallahassee.
A STUDY OF THE ACOUSTIC REFLEX AS ELICITED BY SELECTED ENVIRONMENTAL NOISE STIMULI Ph.D. Thesis
Marshall Melvin Smith 1981 114 p
Avail: Univ. Microfilms Order No. 8125790

The acoustic reflex thresholds (ARTs) for the environmental noise ranged from 78.83 through 81.78 db SPL. The ARTs for the white noise, and the pure-tone were 81.38 and 95.19 dB SPL, respectively. For all practical purposes (19%) the ARTs for the environmental noises lie within + or - 5 db of the ART for the white noise. The latency at threshold for the environmental noises ranged from 452.5 through 552.50 msec. Similarly, the latencies were 402.5 and 487.5 msec for the white noise and the pure-tone, respectively. The latency at dB SL sub R (20 dB above the threshold) for the environmental noises ranged from 152 through 180 msec. There was a decrease in latency at 20 dB SL sub R compared to that at threshold across all the stimuli. The contraction rate at 20 dB SL sub R for all stimuli ranged from .0009 through .0011 cc/msec. The contraction magnitude at 20 dB SL sub R for all the environmental noises and the white noise ranged from .669 through .816 cc.
Dissert. Abstr.

N82-17859 North Carolina Univ. at Chapel Hill.
STUDIES ON STRUCTURE AND FUNCTION RELATIONSHIP IN FIBRINOGEN Ph.D. Thesis
Nadia Aldyth Carrell 1981 160 p
Avail: Univ. Microfilms Order No. 8125561

The literature concerning the chemical properties of fibrinogen

and the mechanisms of fibrinogen function was reviewed. The experimental work was aided by the availability of two patients with congenital molecular variants of fibrinogen and one patient with an inhibitor to fibrin polymerization. The fibrinogen level in the first patient was found to be about one third of the normal level by both coagulation and immunologic methods. The second patient had a low plasma level of clotable protein with normal antigen concentration, high amounts of fibrinogen related material in serum, and prolonged thrombin and reptilase clotting times. The third patient developed an inhibitor which markedly prolonged the thrombin and reptilase times of both patient and normal plasmas. A procedure was developed to direct chemical modifications selectively at lysine residues which function in polymerization. An assay to measure the binding of fibrinogen to fixed washed platelets was developed. Dissert. Abstr.

N82-17860 Florida Univ., Gainesville.
FORWARD MASKING OF AUDITORY NERVE (N SUB 1) AND BRAINSTEM RESPONSES (WAVE V) IN HUMANS Ph.D. Thesis
Steven John Kramer 1981 186 p
Avail: Univ. Microfilms Order No. 8127440

The influence of a response to one sound (probe) another sound (masker) when the two sounds occur simultaneously or in a temporal relation was demonstrated. The effects of forward masking on wave-V of the ABR along with N responses recorded simultaneously (on a separate channel) from the ear canal were investigated. Postmasking recovery functions were measured for different masker durations, masker levels, and masker low frequency cutoffs (high-pass masking). The effects on wave-V were different than on N1. The primary effects of forward masking on the probe responses were decreases in N1 amplitude and increases in wave-V latency. Characteristic changes in the recovery functions for variations on masker parameters were found. It is suggested that the relation between wave-V latency and N1 amplitude, along with other characteristics of underlying mechanisms include a recording of the neutral input (N1) within the brainstem pathways generating the wave-V potential.
Dissert. Abstr.

N82-17861 Ohio Univ., Athens.
HUMAN AUDITORY BRAINSTEM ELECTRIC RESPONSES TO BINAURAL AND MONAURAL STIMULI Ph.D. Thesis
Paul Alfred Lobaugh 1981 149 p
Avail: Univ. Microfilms Order No. 8126058

The auditory brainstem electric response (ABER) is recorded from electrodes attached to the scalp of humans and consists of a series of sub-microvolt peaks which occur in the 10 ms period following presentation of simple auditory stimuli such as clicks. The ABER differences due to binaural and monaural stimulation which are defined as binaural interaction are investigated. It is also possible that binaural signal processing, if reflected by the ABER, may occur in an asymmetric manner. The effects of a stimulus variable, click polarity, and a subject variable, headsize, upon the ABER are studied. Click-evoked ABERs were acquired from 44 normally hearing adolescent and adult subjects. Responses to binaural and monaural stimulation were analyzed. It is concluded that polarity of the stimulus does not affect ABERs in response to 60 and 70 dB SL clicks. For 80 dB SL stimulation, negative polarity clicks evoke shorter latency waves than do positive polarity clicks. Dissert. Abstr.

N82-17862*# Narco Scientific, Houston, Tex.
PORTABLE MEDICAL STATUS AND TREATMENT SYSTEM Final Report
Dec. 1981 25 p
(Contract NAS9-15821)
(NASA-CR-167496) Avail: NTIS HC A02/MF A01 CSCL 06E

A portable medical status and treatment system is discussed. The vital signs monitor includes electrocardiogram, respiration, temperature, blood pressure, alarm, and power subsystems, which are described. A DC defibrillator module, a radio module, and their packaging are also described. These subsystems were evaluated and the results and recommendations are presented.
S.L.

N82-17863# Institute of Human Performance, Fairfax, Va.
PHYSICAL PERFORMANCE TASKS REQUIRED OF U. S. MARINES OPERATING IN A DESERT ENVIRONMENT
Paul O. Davis, Arthur V. Curtis, Jr., and Steven A. Bixby Nov. 1981 62 p refs
(Contract N00014-80-C-0473)
(AD-A107866; TR-7) Avail: NTIS HC A04/MF A01 CSCL 15/7

Nine representatives of the Institute of Human Performance were integrated into a marine battalion during a CAX (combined arms exercise) for the purpose of gathering descriptive and objective information regarding the nature and types of physical performance tasks encountered by marine infantrymen (MOS 0311) during desert combat. Through the use of minicassette recorders, scales, cameras and other data collection equipment, scenarios were described which typify the critical, frequent and strenuous types of tasks indigenous to marines in this environment. Distances covered on foot, loads carried, rates of travel and grades encountered are detailed and described as well as other environmental overlays which impact on troop performance. It was determined that for the most part, a mechanized, motorized combat scenario does not require high levels of physical ability; however, fire team rushes represent a critical scenario, with high levels of aerobic and anaerobic power, particularly when performed in ambient temperatures of 100-107 F. A taxonomy of physical tasks from this environment will be added to physical performance data from other Marine Corps theaters of operations for the purpose of developing a complete job analysis of activities involving strength and endurance factors. Author (GRA)

N82-17864# California Univ., Irvine. Dept. of Community and Environmental Medicine.
CYTOLOGIC AND BIOCHEMICAL GENETIC EFFECTS OF CHEMICAL CARCINOGENS Annual Report, 1 Jul. 1980 - 30 Jun. 1981
Ronald E. Rasmussen Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. Oct. 1981 43 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107615; AFAMRL-TR-81-82) Avail: NTIS HC A03/MF A01 CSCL 06/20

The first project is concerned with the relationship between initiation of cancer by chemicals and the damage and repair of DNA in cells and tissues susceptible to the carcinogenic action of the chemicals. The working hypothesis is that interaction of the carcinogen with cellular DNA is a necessary step in carcinogenesis and that this interaction may cause DNA damage which is then followed by DNA repair synthesis. The second project was conducted with the cooperation of the staff of the Toxic Hazards Research Unit at AMRL, WPAFB. Rats and hamsters were exposed by inhalation to hydrazine at 750 ppm for one hour. Groups of animals which had been exposed only once or which had been exposed 10 times were shipped to UC Irvine for study. The factors studied were (1) DNA replication in the lung; (2) DNA repair synthesis in the lung; (3) Cellular replication in the lung and nasal turbinates; and (4) Metabolism of a known lung carcinogen, 3H-benzo(a)pyrene, by lung slices from the treated animals. The third project was initiated during the current year with the goal of developing an animal model in which biochemical and cytogenetic factors could be studied during the process of tumorigenesis. Range-finding studies are underway at the Toxic Hazards Research Unit (THRU) to establish the intratracheal dosage of 3-methylcholanthrene (MCA) necessary to produce a high yield of lung tumors in Fischer 344 rats within 12 months. GRA

N82-17865# California Univ., Irvine. Dept. of Community and Environmental Medicine.
COMPARATIVE BIOCHEMISTRY AND METABOLISM. PART 1: CARCINOGENESIS Annual Report, Jun. 1980 - May 1981
Robert C. Shank Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. Oct. 1981 38 p refs
(Contract F33615-80-C-0512; AF Proj. 6302)
(AD-A107614; AFAMRL-TR-81-83-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 06/20

Oral administration of the inorganic hepatotoxin, hydrazine, to male Fischer 344 or Sprague Dawley rats results in the endogenous methylation of liver DNA at the 7- and O6-positions

of guanine. At doses below the LD50 (45, 60 or 75 mg hydrazine/kg body weight), methylation levels varied little and averaged about 500 micromol 7-methylguanine/mol guanine and 20 micromol O6-methylguanine/mol guanine. At 90 mg hydrazine/kg body weight (approximately the 7-day LD50) the methylation levels were 869 micromol 7-methylguanine and 58 micromol O6-methylguanine/mol guanine 24 hours after toxicant administration. A single dose of 3 mg hydrazine/kg body weight did not result in detectable levels of methylguanines in liver DNA; however, after three or four daily administrations of hydrazine at this dose, liver damage was evident, and liver DNA contained 50-100 micromol 7-methylguanine/mol guanine, about the limit of analytical detection. Following a single oral administration of 90 mg hydrazine/kg body weight, liver DNA guanine rapidly became methylated. The time for half-maximum alkylation at 7-guanine was 30 minutes and at O6-guanine, 45 minutes. The rates of removal of these methylated bases were consistent with published values from experiments using methylating carcinogens and with values obtained in this laboratory with the model compound, 1,2-dimethylhydrazine.

GRA

N82-17866# Environmental Protection Agency, Ann Arbor, Mich. Inspection and Maintenance Staff.

HEALTH EFFECTS OF CARBON MONOXIDE AND OZONE

Jul. 1981 20 p refs Prepared in cooperation with Energy and Environmental Analysis, Inc., Arlington, Va.

(PB82-114265; EPA-AA-IMS-81-8) Avail: NTIS HC A02/MF A01 CSCL 06T

The information known about the health effects of carbon monoxide (CO) and ozone (O3) is summarized. How that information is used by EPA to set National Ambient Air Quality Standards is discussed. The sources most likely to contribute to high levels of CO and O3 and how EPA control programs will reduce emissions from these sources in the future are discussed. The health effects on humans and plants are discussed.

Author (GRA)

N82-17867 American Univ., Washington, D. C.

A MODEL FOR ESSENTIAL HYPERTENSION: METABOLIC STUDIES Ph.D. Thesis

James Patterson Church 1981 101 p

Avail: Univ. Microfilms Order No. 8126862

The extent to which blood pressures and tissue lipid levels are manipulated by dietary control of low levels of essential fatty acids in rat strains used as models of hypertensive and normotensive man were determined. Procedures included gravimetric total lipids, colorimetric cholesterol and phospholipids, fluorimetric triglycerides and gas liquid chromatographic fatty acids. Samples were taken from plasma liver and kidney. Total lipids were lower in plasma, liver, and kidney of the SHR than the WKY. Liver triglyceride and kidney cholesterol and phospholipid (PL) were lower with liver PL higher in SHR than in WKY. Total individual fatty acids in plasma and in neutral lipid and PL fractions of liver and kidney exhibited several strain and diet differences. A high metabolic rate in the SHR suggests defective transport of essential fatty acids from the liver. Dissert. Abstr.

N82-17868 California Univ., San Diego.

CEREBRAL HEMISPHERIC ACTIVITY AND AUTOMONIC NERVOUS FUNCTION Ph.D. Thesis

Deborah Ann Werntz 1981 130 p

Avail: Univ. Microfilms Order No. 8125444

An otherwise unknown relationship between cerebral hemispheric activity, as exhibited by the EEG, and the autonomic nervous system as exhibited by the nasal cycle and its self-induced alteration as regulated by forced uninostril respiration is demonstrated. It is proposed that the correlation of the nasal cycle with alternating relative EEG amplitude asymmetry is indicative of and consistent with a single ultradian ocillator system. It is also proposed that the nasal cycle is controlled via a central mechanism, whereby the hypothalamus regulates the sympathetic/parasympathetic balance and the vasomotor tone throughout the body. The 'feedback' effect of nasal airflow on EEG asymmetry is mediated through the olfactory system and its connecting pathways to the hypothalamus. The data demonstrate the individual's ability to noninvasively and predictably after cortical activity and possibly other autonomic functions. Dissert. Abstr.

N82-17869 Michigan State Univ., East Lansing.

THE ROLE OF INTESTINAL NERVES IN THE NUTRIENT INDUCED INTESTINAL HYPEREMIA Ph.D. Thesis

Richard Arlan Nyhof 1981 124 p

Avail: Univ. Microfilms Order No. 8126536

The blood flow to the small intestine increases following a meal, and this hyperemia appears to be localized to those portions of the intestine exposed to nutrients. Evidence indicates that local intestinal nerves may participate in producing this hyperemia. The venous outflow of isolated canine jejunal segments, the arteriovenous oxygen difference, and the rate of oxygen consumption were measured before and after administration of a local anesthetic and several neurotransmitter antagonists. Intestinal nerves do not appear to play a role in the intestinal hyperemia produced by luminal placement of nutrient solutions. On the basis of the magnitude of hyperemic and metabolic responses, the hyperemia produced by glucose appears to be metabolically mediated. The oleic acid induced hyperemia more closely resembles that produced by vasodilator chemicals. The hyperemia produced by food would likely involve a combination of these mechanisms. Dissert. Abstr.

N82-17870 Yale Univ., New Haven, Conn.

REGULATION OF CALCIUM CURRENT AND CALCIUM ACTIVITY IN HEART CELLS Ph.D. Thesis

Eduardo Marban 1981 152 p

Avail: Univ. Microfilms Order No. 8125689

The regulation of calcium current in mammalian ventricular muscle and Purkinje fibers was studied by voltage clamp technique. The effects of changes in intracellular calcium on the size of the slow inward calcium current (I sub si) were found to explain the digitalis-induced increase in this current, as well as some properties of the inactivation of I sub si. The involvement of K+ as a charge carrier of the transient outward current is shown Ca entry leads to inactivation, as previously suggested for Paramecium, Aplysia neurons, and stick insect skeletal muscle. Enhancement of I sub si is observed in association with the positive inotropic effect of digitalis. It is suggested that a rise in Na sub I leads to increased I sub si possibly through a secondary rise in Ca. Quiescent ventricular muscle, a mean free Ca2+ concentration of micro is found. During contractures, transients rising up to 10 micro are reported. In studying the effects of catecholamines on free Ca2+ and force, it is evidenced that epinephrine reduces myofibrillar Ca2+ sensitivity in heart muscle. Dissert. Abstr.

N82-17239# Joint Publications Research Service, Arlington, Va.

STATUS OF SPACE BIOMEDICAL PROGRAMS

Avadalik Ignatyevich Burnazyan *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 29-33 Transl. into ENGLISH from Pravda (Moscow), 15 Jun. 1981 p 3 (For primary document see N82-17235 08-12)

Avail: NTIS HC A05/MF A01

N82-17814# Joint Publications Research Service, Arlington, Va.

EFFECT OF STATIONARY MAGNETIC FIELD ON THE ENDOCRINE SYSTEM

Ye. A. Zagorskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 14-20 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 14-17 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

N82-17816# Joint Publications Research Service, Arlington, Va.

AMINO ACID METABOLISM DURING PROLONGED INTAKE OF DEHYDRATED FOODS AND SIMULATION OF SOME SPACE FLIGHT FACTORS

V. P. Bychkov, I. I. Borodulina, and T. F. Vlasova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 26-29 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. Oct. 1981 p 21-23 (For primary document see N82-17812 08-51)

Avail: NTIS HC A07/MF A01

(USSR), v. 15, no. 5, Sep. - Oct. 1981 p 23-27 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17818# Joint Publications Research Service, Arlington, Va.
PREVENTION OF STAPHYLOCOCCAL INFECTIONS DURING SPACE FLIGHTS
S. N. Zaloguyev, A. N. Viktorov, V. P. Gorshkov, T. Yu Norkina, and M. M. Shinkareva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 35-38 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 27-29 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17819# Joint Publications Research Service, Arlington, Va.
HUMAN ADRENOSYMPATHETIC SYSTEM DURING IMMERSION IN WATER
N. A. Davydova, R. A. Tigranyan, and Ye. B. Shulzhenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 39-44 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 30-34 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17821# Joint Publications Research Service, Arlington, Va.
CARDIAC OUTPUT AND CARDIAC CYCLE PHASE STRUCTURE OF PILOTS DURING FLIGHTS
V. A. Degtyarev, V. S. Bednenko, A. B. Vasilyev, A. N. Kozlov, V. Ya. Kolyagin, and A. P. Yarunin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 50-54 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 38-41 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17822# Joint Publications Research Service, Arlington, Va.
HUMAN LIPID METABOLISM DURING CONFINEMENT IN PRESSURE CHAMBER
V. P. Bychkov and O. S. Khokhlova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 55-58 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 41-43 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17824# Joint Publications Research Service, Arlington, Va.
VITAMIN C, B SUB 1 AND B SUB 6 EXCRETION IN URINE DURING 182-DAY ANTIORTHOSTATIC HYPOKINESIA
V. P. Bychkov and V. A. Korshunova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 63-67 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 46-49 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17825# Joint Publications Research Service, Arlington, Va.
JUGULAR, RIGHT ATRIAL PRESSURE AND CEREBRAL HEMODYNAMICS OF HEALTHY MAN SUBMITTED TO POSTURAL TESTS
V. Ye. Katkov, V. V. Chestukhin, V. V. Rumyantsev, A. Z. Troshin, and O. Kh. Zybin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 6873 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 49-53 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17826# Joint Publications Research Service, Arlington, Va.
EFFECTS OF EMBIENT PARAMETERS ON MAN
R. M. Arslanova, I. Ye. Ganelina, V. Ye. Manoylov, L. K. Sapozhkov, and S. K. Churina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep.-Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 74-77 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 53-55 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17827# Joint Publications Research Service, Arlington, Va.
ANTIHYPOXIC EFFICACY OF INTERMITTENT MODE OF PRESSURE CHAMBER CONDITIONING OF MAN
A. Yu. Katkov, Ye. A. Kovalenko, G. A. Davydov, R. N. Chabdarova, S. A. Vtoryy, A. P. Manik, Yu. A. Spasskiy, Yu. P. Starshinov, and N. M. Utkina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 78-81 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 56-58 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17828# Joint Publications Research Service, Arlington, Va.
INFORMATIVENESS OF ULTRASONIC DOPPLER CARDIOGRAPHY IN EVALUATION OF CORONARY CIRCULATION
V. S. Bednenko, V. A. Degtyarev, A. N. Kozlov, N. N. Popov, and G. K. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-86 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 58-61 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17829# Joint Publications Research Service, Arlington, Va.
AGE RELATED DISTINCTIONS OF COSMONAUTS REGIONAL HEMODYNAMICS
I. D. Vasilyeva, Kh. Kh. Yarullin, and V. I. Zhuyko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 82-90 ref Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 61-64 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17830# Joint Publications Research Service, Arlington, Va.
COMPARATIVE EVALUATION OF ANTIMICROBIAL ACTIVITY OF SOME URINE PRESERVATIVES
T. Ye. Lebedeva, I. V. Yakimova, N. M. Nazarov, and S. V. Chizhov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 91-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 64-66 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17836# Joint Publications Research Service, Arlington, Va.
BLOOD FIBRINOGEN AS RELATED TO IMMERSION IN WATER FOR SEVEN DAYS AND SHORT-TERM SPACE FLIGHT
A. N. Fomin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 119-122 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 83-85 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17850# Joint Publications Research Service, Arlington, Va.
CURRENT PROBLEMS OF RADIOBIOLOGY OF ELECTROMAGNETIC RADIATION OF RADIO-FREQUENCY RANGE
I. G. Akoyev *In its* USSR Rept.: Life Sci. Effect on Nonionizing

N82-17817# Joint Publications Research Service, Arlington, Va.
EFFECT OF SPACE FLIGHTS OF DIFFERENT DURATION ON ENERGY METABOLISM OF HUMAN ERYTHROCYTES
A. S. Ushakov, S. M. Ivanova, S. S. Brantova, and O. I. Labetskaya *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 30-34 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med.

Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 37-43 refs Transl. into ENGLISH from Radiobiol. (USSR), v. 20, no. 1, Jan. - Feb. 1980 p 3-8 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

N82-17852# Joint Publications Research Service, Arlington, Va.
MORTALITY IN ACUTE MYOCARDIAL INFARCTION AS FUNCTION OF GEOMAGNETIC FIELD ACTIVITY IN YEREVAN
N. N. Karazyan and L. A. Akhverdyan *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 51-55 Transl. into ENGLISH from Dokl. Akad. Nauk Arm. SSR (USSR), v. 22, no. 3, 1981 p 188-191 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

N82-17853# Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPOGEOMAGNETIC FIELD ON ACTIVITY OF SOME CEREBRAL ENZYMES
A. V. Shakula and G. M. Chernyakov *In its* USSR Rept.: Life Sci. Effect on Nonionizing Electromagnetic Radiation, No. 4 (JPRS-79780) 4 Jan. 1982 p 56-59 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 9, Sep. 1981 p 11-13 (For primary document see N82-17844 08-51)
Avail: Issuing Activity

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-17871*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN EVALUATION OF HELICOPTER NOISE AND VIBRATION RIDE QUALITIES CRITERIA
C. E. Hammond, D. D. Hollenbaugh, S. A. Clevenson, and J. D. Leatherwood Dec. 1981 14 p refs Presented at the Technol. for the Jet Smooth Ride, A Natl. Specialists' Meeting on Helicopter Vibration, Hartford, Conn., 2-4 Nov. 1981; sponsored by the American Helicopter Society Prepared in cooperation with Army Research and Technology Lab., Fort Eustis, Va.
(NASA-TM-83251) Avail: NTIS HC A02/MF A01 CSCL 05H

Two methods of quantifying helicopter ride quality; absorbed power for vibration only and the NASA ride comfort model for both noise and vibration are discussed. Noise and vibration measurements were obtained on five operational US Army helicopters. The data were converted to both absorbed power and DISC's (discomfort units used in the NASA model) for specific helicopter flight conditions. Both models indicate considerable variation in ride quality between the five helicopters and between flight conditions within each helicopter. T.M.

N82-17872*# Singer Co., Sunnyvale, Calif.
VTOL/STOL VISUAL STUDY Final Report
Frank P. Lewandowski Jun. 1980 38 p
(Contract NAS2-10222)
(NASA-CR-166292) Avail: NTIS HC A03/MF A01 CSCL 05I

The development of data bases and real time techniques to improve the realism of sea state, bow and stern wake, and ship motion is addressed. This system was designed for use with the Vertical Motion Simulator to perform basic studies on VTOL/STOL aircraft. B.W.

N82-17873# Dunlap and Associates, Inc., La Jolla, Calif.
DEVELOPMENT OF THE AUTOMATED PERFORMANCE ASSESSMENT AND REMEDIAL TRAINING SYSTEM (APARTS): A LANDING SIGNAL OFFICER TRAINING AID Final Report, Sep. 1979 - Mar. 1981
Steven T. Breidenbach and Clyde A. Brictson Orlando, Fla. Naval Training Equipment Center Jun. 1981 53 p refs
(Contract N61339-79-D-0105)
(AD-A106224; NAVTRAEQUIPC-79-D-0105-1) Avail: NTIS HC A04/MF A01 CSCL 05/9

Development of the automated performance assessment and remedial training system (APARTS) is described. The APARTS is an automated training aid designed to assist the landing signal officer (LSO) in training pilots during the acquisition of carrier landing skills. The APARTS is based on general principles of learning and provides graphic displays of pilot landing technique problems for LSO evaluation and pilot feedback. The APARTS also integrates field carrier landing practice, conducted in the aircraft, with night carrier landing training (NCLT) instruction. Once landing problems are identified and feedback is provided to the pilot, remedial instruction is given in the NCLT. An improved APARTS conceptual model along with two computer programs designed to process, store and graphically display pilot performance data are described. Future APARTS developments are outlined for improved carrier landing effectiveness. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-17874*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
TIME DOMAIN IDENTIFICATION OF AN OPTIMAL CONTROL PILOT MODEL WITH EMPHASIS ON THE OBJECTIVE FUNCTION
David K. Schmidt 1982 22 p refs Presented at AFFTC/NASA Dryden/AIAA Workshop on Flight Testing to Identify Pilot Workload and Pilot Dynamics, Edwards, Calif., 19-21 Jan. 1981 (Grant NAG4-1)
(NASA-CR-168487) Avail: NTIS HC A02/MF A01 CSCL 05H

A method for the identification of the pilot's control compensation using time domain techniques is proposed. From this information we hope to infer a quadratic cost function, supported by the data, that represents a reasonable expression for the pilot's control objective in the task being performed, or an inferred piloting strategy. The objectives for this method are: (1) obtain a better understanding of the fundamental piloting techniques in complex tasks, such as landing approach; (2) the development of a metric measuurable in simulations and flight test that correlate with subjective pilot opinion; and (3) to further validate pilot models and pilot vehicle analysis methods. E.A.K.

N82-17875*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HUMAN-MACHINE INTERFACE ISSUES IN THE MULTI-SATELLITE OPERATIONS CONTROL CENTER-1 (MSOCC-1) Technical Memorandum, 1 Jun. - 7 Aug. 1981
Christine M. Mitchell (George Mason Univ.) Aug. 1981 68 p refs
(NASA-TM-83826) Avail: NTIS HC A04/MF A01 CSCL 05H

An analysis of the Multisatellite Operations Control Center facilities (MSOCC-1) is presented. The analysis focuses on the human machine interfaces and interactions present in the data operations control area, the computer support operations, and the mission operations rooms in both current facilities and the proposed automated MSOCC-1. An alternative approach to the design of the automated MSOCC-1, which highlights human

factors and human machine interaction dimensions of the design process, is also presented. S.L.

N82-17876# Federal Aviation Administration, Washington, D.C.
DOT/FAA HUMAN FACTORS WORKSHOP ON AVIATION. TRANSCRIPT, VOL 1
Nov. 1980 112 p Workshop held at Cambridge, Mass., 24-25 Nov. 1980 2 Vol.
(AD-A107802) Avail: NTIS HC A06/MF A01 CSCL 01/2

The opinions of airline pilots are considered in a presentation of aviation human factors safety issues. Human behavior is considered in the design, operation, and maintenance of aviation man machine systems. GRA

N82-17877# Federal Aviation Administration, Washington, D.C.
DOT/FAA HUMAN FACTORS WORKSHOP ON AVIATION. TRANSCRIPT, VOLUME 2
25 Nov. 1980 219 p refs Workshop held at Cambridge, Mass., 24-25 Nov. 1980
(AD-A107803) Avail: NTIS HC A10/MF A01 CSCL 01/2

Training issues and flight fatigue are considered in a presentation of aviation human factors safety issues. Human behavior is considered in the design, operation, and maintenance of aviation man machine systems. GRA

N82-17813# Joint Publications Research Service, Arlington, Va.
IN-FLIGHT DIETS AND QUANTITATIVE ADEQUACY THEREOF TO PILOT EXPENDITURE
I. G. Popov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 1-13 refs Transl. into English from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 4-14 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

N82-17815# Joint Publications Research Service, Arlington, Va.
DIET OF CREWS OF THREE MAIN EXPEDITIONS ABOARD SALYUT-6 ORBITAL STATION
V. P. Bychkov, S. Kalandarov, M. V. Markaryan, N. D. Radchenko, K. A. Stepchkov, and M. L. Frumkin *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 15, No. 5, Sep. - Oct. 1981 (JPRS-79346) 2 Nov. 1981 p 21-25 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmich. Med. (USSR), v. 15, no. 5, Sep. - Oct. 1981 p 17-20 (For primary document see N82-17812 08-51)
Avail: NTIS HC A07/MF A01

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N82-17878*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
USER'S GUIDE FOR SKETCH
David R. Hedgley, Jr. Feb. 1982 13 p
(NASA-TM-81369; H-1169) Avail: NTIS HC A02/MF A01 CSCL 09B

A user's guide for the computer program SKETCH is presented. The removal of hidden lines from images of solid objects is a problem in computer graphics which is solved by SKETCH. S.L.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

N82-17879*# Case Western Reserve Univ., Cleveland, Ohio.
INVESTIGATION AND EVALUATION OF A COMPUTER PROGRAM TO MINIMIZE THREE-DIMENSIONAL FLIGHT TIME TRACKS Final Report, 15 Sep. 1980 - 12 Aug. 1981
Frederic I. Parke 12 Aug. 1981 150 p
(Grant NAG3-101)
(NASA-CR-168419) Avail: NTIS HC A07/MF A01 CSCL 09B

The program for the DC 8-D3 flight planning was slightly modified for the three dimensional flight planning for DC 10 aircrafts. Several test runs of the modified program over the North Atlantic and North America were made for verifying the program. While geopotential height and temperature were used in a previous program as meteorological data, the modified program uses wind direction and speed and temperature received from the National Weather Service. A scanning program was written to collect required weather information from the raw data received in a packed decimal format. Two sets of weather data, the 12-hour forecast and 24-hour forecast based on 0000 GMT, are used for dynamic processes in testruns. In order to save computing time only the weather data of the North Atlantic and North America is previously stored in a PCF file and then scanned one by one. R.J.F.

N82-17880*# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Computer Engineering and Science.
SHADED COMPUTER GRAPHIC TECHNIQUES FOR VISUALIZING AND INTERPRETING ANALYTIC FLUID FLOW MODELS Final Report, Jul. 1978 - Jun. 1981
Frederic I. Parke Jun. 1981 17 p refs
(Grant NsG-3207)
(NASA-CR-168418) Avail: NTIS HC A02/MF A01 CSCL 09B

Mathematical models which predict the behavior of fluid flow in different experiments are simulated using digital computers. The simulations predict values of parameters of the fluid flow (pressure, temperature and velocity vector) at many points in the fluid. Visualization of the spatial variation in the value of these parameters is important to comprehend and check the data generated, to identify the regions of interest in the flow, and for effectively communicating information about the flow to others. The state of the art imaging techniques developed in the field of three dimensional shaded computer graphics is applied to visualization of fluid flow. Use of an imaging technique known as 'SCAN' for visualizing fluid flow, is studied and the results are presented. S.L.

N82-17881# Naval Underwater Systems Center, Newport, R.I. Combat Control Systems Dept.
INTERCOMPUTER TRANSPORTATION OF ASSEMBLY LANGUAGE SOFTWARE THROUGH DECOMPILATION
Donald L. Brinkley 15 Oct. 1981 46 p refs
(AD-A107645; NUSC-TR-6004) Avail: NTIS HC A03/MF A01 CSCL 09/2

Portability of assembly language software can be achieved in a practical way only through the use of automated translators. The fact that translation between two representations at the same semantic level is a clumsy and difficult task has frustrated the development of such technology. This clumsiness stems from the fundamental differences in the architectural structures of different machines. In its simplest form, the translation process actually becomes the process of simulating one machine or another. The goal of such translation, however, should be the generation of assembly language code for the target machine that approximates, in efficiency and in appearance, code written to perform the same task by a 'good' assembly language programmer in the target language. A translator that performs a decompilation of the source program into an intermediate representation at a higher semantic level is described. Code in the target assembly language can later be generated from this

intermediate representation. This translation scheme is shown to remove most of the machine dependency from assembly language software. Author (GRA)

N82-17882# National Communications System, Washington, D. C.
OPEN SYSTEMS INTERCONNECTION (OSI) REFERENCE MODEL (AUG. 1981) (ISO SECOND DRAFT PROPOSAL (DP) 7498)
Sep. 1981 113 p refs
(AD-A107644; NCS-TIB-81-1A) Avail: NTIS HC A06/MF A01 CSCL 09/2

The reference model was developed to establish a framework for the coordination of existing and future standards developed to facilitate the interconnection of information systems. The model does not specify services and protocols for interconnection. It is designed to be the common basis for the planning and coordination of consistent standard protocols and families of protocols in a hierarchical manner. Implementation of standards development in consonance with the Model should allow the exchange of information among terminal devices, computers, people, application processes, etc., that are 'open' to each other by virtue of their mutual use of applicable standards. The Reference Model has a hierarchical organization of 7 architectual layers, based on the transfer of data by telecommunication means. GRA

N82-17883# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
COMPUTER SCIENCE AND TECHNOLOGY: AN ASSESSMENT AND FORECAST OF ADP IN THE FEDERAL GOVERNMENT Final Report
Martha Mulford Gray Aug. 1981 160 p
(PB82-116112; NBS-SP-500-79; LC-81-600094) Avail: NTIS HC A08/MF A01 CSCL 05C

The findings of the International Data Corporation (IDC) on the current status of Federal ADP and projects ADP trends in the Federal Government for 1979 through 1985 are summarized. Hardware areas included are computers and related peripheral equipment such as magnetic tape drives, disk drives, terminals, printers, modems, multiplexers, and word processors. Other areas included are: an analysis of programming languages; analysis of software spending; analysis of installation workload by mode of operation and by application; implementation of data base management systems; scope of contract services in the Federal Government in selected Federal installations. GRA

N82-17087# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED DATA PROCESSING: WHAT IS IT?
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs (For primary document see N82-17086 08-01)
(Contract N00014-79-C-0873)
Avail: NTIS HC A18/MF A01

N82-17094# FGAN, Wachtberg-Werthhoven (West Germany).
EXPERIENCES WITH THE EXPERIMENTAL FFM-MCS
Hermann von Issendorff *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17095# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
SAVANT: A DATABASE MANIPULATION TECHNIQUE FOR SYSTEM ARCHITECTURE DESIGN VERIFICATION AND ANALYSIS
A. A. Callaway *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17098# Ferranti Ltd., Bracknell (England). Computer System Div.
FUNCTIONAL DOCUMENTATION. A PRACTICAL AID TO THE ORDERLY SOLUTION OF THE SYSTEM DESIGN PROBLEM
J. J. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17101# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED AND DECENTRALIZED CONTROL IN FULLY DISTRIBUTED PROCESSING SYSTEMS
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 p 16 refs (For primary document see N82-17086 08-01)
(Contract F30602-78-C-0120)
Avail: NTIS HC A18/MF A01

N82-17107# Litton Technische Werke, Freiburg (West Germany).
RECONFIGURATION: A METHOD TO IMPROVE SYSTEMS REALIABILITY
J. Szlachta *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17108# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
A RECONFIGURABLE CHANGE NETWORK FOR DISTRIBUTED PROCESS CONTROL [RESEAU D'ECHANGE RECONFIGURABLE POUR CONTROLE DE PROCESSUS REPARTI]
Ch. Meraud and B. Maurel (Societe. Anonyme de Telecommunications) *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs In FRENCH (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17109# Norwegian Defence Research Establishment, Kjeller.
PROTOCOL LEVEL MODULES FOR COST EFFECTIVE STANDARD COMPUTER COMMUNICATION
Oyvind Hvinden, Yngvar Lundh, and Oystein Sandholt *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17112# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).
THE TRAFFIC FLOW IN A DISTRIBUTED REAL TIME COMPUTING SYSTEM (RDC-SYSTEM) WITH A FIBER-OPTIC RINGBUS SYSTEM
Dirk Heger and Reinhard Baehre *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17116# Naval Weapons Center, China Lake, Calif. Facility Engineering Branch.
STATE-OF-THE-ART COMPUTER MONITORING EQUIPMENT
Harvey G. Nelson *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-17884*# Mississippi State Univ., Mississippi State. Engineering and Industrial Research Station
A STUDY OF HIGH DENSITY BIT TRANSITION REQUIREMENTS VERSUS THE EFFECTS ON BCH ERROR CORRECTING CODING Interim Final Report, 1 Jul. 1980 - 31 Dec. 1981
Frank Ingels and William O. Schoggen 31 Dec. 1981 100 p refs

(Contract NAS8-33887)
(NASA-CR-161957; MSSU-EIRS-EE-81-5) Avail: NTIS HC A05/MF A01 CSCL 09B

The various methods of high bit transition density encoding are presented, their relative performance is compared in so far as error propagation characteristics, transition properties and system constraints are concerned. A computer simulation of the system using the specific PN code recommended, is included.
S.L.

N82-17885# Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
COMPUTER INTERPRETATION OF A DYNAMIC IMAGE FROM A MOVING VEHICLE Ph.D. Thesis
Thomas Dell Williams May 1981 297 p refs
(Contract N00014-75-C-0459; Grant NSF DCR-75-16098)
(AD-A107565; COINS-TR-81-22) Avail: NTIS HC A13/MF A01 CSCL 09/2

The goal of this thesis is the design and implementation of a computer program that constructs an interpretation of images of a natural scene, in particular one imaged while the camera is in a moving automobile. The succession of images is to be interpreted in terms of surfaces and objects in three dimensional space. The agreement between image dynamics and an internal surface model of the environment is measured by comparing a pair of temporally disparate images (two movie frames). Using the model, an image taken at one location can be transformed into a synthetic image of the scene as it would be viewed from another location. This synthesis accounts for point displacements and occlusion effects as predicted by the internal model. Differences between the real and the synthetic images are then used as an error measure in a search that refines the model. Once the model is refined, unresolved errors are used to correct the initial surface model by resegmenting the image into a better approximation of the surfaces in the environment. GRA

N82-17886# Missouri Univ. -Columbia. Dept. of Statistics.
AN ISOTONIC REGRESSION ALGORITHM Technical Report, Jun. 1981
Richard L. Dykstra Jul. 1981 18 p refs
(Contract N00014-78-C-0655)
(AD-A107620; TR-106) Avail: NTIS HC A02/MF A01 CSCL 12/1

A 'pooling sets' type of algorithm is developed and shown to be valid for computing an isotonic regression function for a general quasi-order. The method is direct and intuitive. The algorithm works best when the quasi-order is complex and the objective function is nearly isotonic. An example is worked out in detail. Author (GRA)

N82-17887# Ohio State Univ., Columbus. Computer Graphics Research Group.
TERRAIN MODEL ANIMATION Final Report, 1 Dec. 1979 - 15 Oct. 1980
John L. Booker, Charles Csuri, Robert Marshall, and Roger Wilson Sep. 1981 48 p
(Contract N61339-80-C-0008)
(AD-A107911; NAVTRAEQUIPC-80-C-0008-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

Procedure models are used to combine fundamental data elements in the creation of unified objects comprising the terrain model. A procedure model to generate trees of various species was implemented. Interactive techniques were developed to generate mountains. An analysis was made of the performance of a Z-buffer display algorithm. Test results are included in the report. Author (GRA)

N82-17888# University of Southeastern Massachusetts, North Dartmouth. Dept. of Electical Engineering.
ON A TWO-DIMENSIONAL MAXIMUM ENTROPY SPECTRAL ESTIMATION METHOD FOR THE TEXTURE IMAGE ANALYSIS
C. H. Chen and Gla-Kinh Young 30 Oct. 1981 28 p refs
(Contract N00014-79-C-0494; NR Proj. 042-422)
(AD-A107569; SMU-EE-TR-81-16) Avail: NTIS HC A03/MF A01 CSCL 09/2

The two dimensional maximum entropy spectral estimation method proposed by Lim and Malik is studied and modified for spectral analysis of texture images. The computational efficiency of the algorithm makes it feasible for minicomputer implementation to extract effective spectral domain texture features for texture discrimination. Extensive computer results are presented. GRA

N82-17889# Naval Underwater Systems Center, New London, Conn.
TWO-CHANNEL LINEAR-PREDICTIVE SPECTRAL ANALYSIS: PROGRAM FOR THE HP 9845 DESK CALCULATOR
Albert H. Nuttall 1 Oct. 1981 58 p refs
(ZR0000101)
(AD-A107634; NUSC-TR-6533) Avail: NTIS HC A04/MF A01 CSCL 12/1

A program for linear-predictive spectral analysis of two channels of data, including estimation of the auto-spectra, cross-spectrum, magnitude-squared-coherence, and the argument of the coherence, is presented in BASIC for the HP 9845 desk calculator. Timing results for the major subroutines are included, and their dependence on the fundamental parameters of the data, filter, and desired spectral resolution is indicated. This technique and program for spectral analysis are very appropriate for short data segments. In particular, a positive-definite spectral matrix estimate is guaranteed. Applications to examples including a strong tonal interference in one channel are made, and a possible shortcoming of the technique is pointed out. A suggested remedy is proposed and a philosophy for multichannel spectral analysis is suggested for further consideration.
Author (GRA)

N82-17890# Computers/Structures International, Oakland, Calif.
THEORETICAL BASIC FOR CTABS80: A COMPUTER PROGRAM FOR THREE-DIMENSIONAL ANALYSIS OF BUILDING SYSTEMS Final Report
Edward L. Wilson, H. H. Dovey, and Ashraf Habibullah Vicksburg, Miss. Army Engineer Waterways Experiment Station Sep. 1981 132 p refs
(AD-A107635; WES-TR-K-81-2) Avail: NTIS HC A07/MF A01 CSCL 13/13

This report presents the theoretical basis for CTABS80, a computer program for the linear three dimensional structural analysis of multistory frame and shear wall buildings subjected to static or dynamic loadings. In CTABS80, the building is idealized as an assemblage of vertical independent frame and shear wall systems interconnected by horizontal floor diaphragms which are rigid in their own plane. The frame and shear wall systems must basically be of rectangular geometry (in elevation) with vertical columns (or piers) and horizontal beams (or spandrels). However, with special modeling techniques, very complex situations may be considered. A special shear panel element is developed to enable modeling of discontinuous shear walls and shear walls with arbitrary openings. A diagonal bracing system to model braced frames (X-braced, K-braced, or eccentrically braced systems) is also presented. The column, shear panel, and diagonal formulations include the effects of bending, axial, and shear deformations. Bending and shear deformations are also included in the beam formulation: however, the effects of axial deformations are neglected. The effects of the finite dimensions of the beams and columns on the stiffness of a frame or shear wall system are automatically included. The buildings may be unsymmetrical and nonrectangular in plan. Torsional behavior and interstory compatibility are accurately reflected in the results. GRA

N82-17891# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
AN UNDERLYING CONTEXT-FREE GRAMMAR OF ALGOL 68 PLUS
L. G. L. T. Meertens and J. C. vanVliet Jul. 1981 22 p refs
(MC-IW-171/81) Avail: NTIS HC A02/MF A01

The description of ALGOL 68+, a superlanguage of ALGOL 68, by a two-level Van Wijngaarden grammar is considered. This type of grammar is not well suited for standard parsing techniques. A method by which a context free grammar is obtained from the two-level grammar is explained. The differences introduced through this transition are discussed. When appropriate, hints are offered as to where during the parsing process these differences can be dealt with in a reasonable way. The context free grammar is presented in a self-explanatory format. Although

this grammar was developed with a very specific (top-down) parsing method in mind, it is general enough to be useful as a starting point for a wide variety of parsing algorithms.
Author (ESA)

N82-17892# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
PEP: AN INTERACTIVE PROGRAMMING SYSTEM WITH AN ALGOL-LIKE PROGRAMMING LANGUAGE
P. W. E. Verhelst and N. F. Verster (Tech. Univ., Eindhoven, Netherlands) Aug. 1981 22 p refs Submitted for publication Sponsored by Netherlands Organization for the Advancement of Pure Research (ZWO)
(MC-IW-172/81) Avail: NTIS HC A02/MF A01

Construction of an interactive programming environment which provides a better structured language than BASIC, but which retains the attractive properties of BASIC systems, is intended. A simple computer network, consisting of a central PDP 11/23 host computer and several small LSI 11 satellite computers for the control of physics experiments, was used. The main tasks of the satellite computers are data acquisition, adjusting experiment parameters, and simple numerical analysis. The system is interpreter based. The language processed by the system allows declaration of variables, constants, and procedures; it has structured statements for conditional and repetitive execution of program parts. Experience shows that the system is much more powerful than available BASIC systems. The slowness of an interpreter based system is completely compensated for by the ease with which the system can be used and by the fast response to program changes. Author (ESA)

N82-17893# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
AN OPERATOR-PRIORITY GRAMMAR FOR ALGOL 68 PLUS
L. G. L. T. Meertens and J. C. vanVliet Aug. 1981 31 p refs
(MC-IW-173/81) Avail: NTIS HC A03/MF A01

How an operator-precedence grammar for ALGOL 68+ can, through a simple right-to-left transduction scheme, be made to be of type LL (1) is discussed. If a grammar is of type LL (1), this easily leads to a parsing method for that grammar, implemented by a set of mutually recursive routines, one for each nonterminal of the grammar. The superlanguage of ALGOL 68, ALGOL 68+, is powerful enough to describe the standard-prelude. If, in addition, the grammar is an operator-priority grammar, an easy and consistent error recovery mechanism can be applied. Such an operator-priority grammar for ALGOL 68+ is given. An account of the differences between the language generated by this grammar, and ALGOL 68+, insofar as these are due to the transition to an operator-priority grammar, is given as well. These differences somehow have to be catered for during the parsing process. Author (ESA)

N82-17894# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
SOME THOUGHTS ON A TUPLE ORIENTED PROGRAMMING SYSTEM
P. Verhelst Aug. 1981 17 p refs
(MC-IW-174/81) Avail: NTIS HC A02/MF A01

The system is intended to be used as the lowest level of an interactive programming system. It is shown how abstract data types and syntax extensions may be handled in this system. A basic framework that supports the definition and manipulation of arbitrary types of objects (including programs) is presented. In the same way as is done in LISP, a translation from programs to tuples is made. The tuple processor executes these translated programs. The tuple form of programs allows manipulation of programs and, by mapping the processor state on tuples, program debugging. By defining all types of objects within this framework, the corresponding operations are automatically available in the programming language. Author (ESA)

N82-17099# British Aircraft Corp., Preston (England). Aircraft Group.
A CONSISTENT APPROACH TO THE DEVELOPMENT OF SYSTEM REQUIREMENTS AND SOFTWARE DESIGN
A. O. Ward *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17100# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
A PEARL SOFTWARE SYSTEM FOR MULTI-PROCESSOR SYSTEMS
P. Elzer and H.-J. Schneider *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 6 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

62 COMPUTER SYSTEMS

Includes computer networks.

N82-17895# Cornell Univ., Ithaca, N. Y. Dept. of Computer Science.
ROUTING IN NETWORKS
John E. Hopcroft and Allan Borodin (Toronto Univ.) Nov. 1981 16 p refs
(Contract N00014-76-C-0018)
(AD-A107841; TR-81-477) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report is concerned with routing protocols in networks. The major result is a low bound for any oblivious routing strategy where the route of a packet depends only on the source and destination of the packet. We show that for any oblivious routing protocol for a network of n processors in which the maximum number of processors directly connected to any processor is d, there exists a permutation that requires time (sq. root of n) d (to the 3/2). For specific networks such as an n-cube we give an oblivious routing algorithm whose performance is close to this lower bound. Author (GRA)

N82-17896# Brookhaven National Lab., Upton, N. Y. Applied Mathematics Dept.
INTRODUCTION TO THE CENTRAL SCIENTIFIC COMPUTING FACILITIES
K. Fuchel Jun 1981 57 p
(Contract DE-AC02-76CH-00016)
(DE82-003258; BNL-51432) Avail: NTIS HC A04/MF A01

Introduction to the Central Scientific Computing Facilities (CSCF) is the first of several documents which make up the BNL CSCF Computer Users Guide. The Introduction provides a broad picture of hardware and software facilities and operational policies of the CSCF. Adhering to the premise that CDC and other software purveyors provide sufficient documentation for their products, the Introduction does not reproduce material found elsewhere but refers the reader to the sections of the manuals pertinent to a particular area of interest. DOE

N82-17102# INRIA, Rocquencourt (France).
RECOVERY IN DISTRIBUTED PROCESSING SYSTEMS
Liba Svobodova *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
Avail: NTIS HC A18/MF A01

N82-17103# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
GENERALIZED POLLING ALGORITHMS FOR DISTRIBUTED SYSTEMS
Jack Keil Wolf *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 9 p refs (For primary document see N82-17086 08-01)
(Grant NSF ESC-79-21140)
Avail: NTIS HC A18/MF A01

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-17897*# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.

COMPUTATIONAL THEORY OF LINE DRAWING INTERPRETATION Final Report

Andrew P. Witkin Hampton, Va. NASA. Langley Research Center Dec. 1981 31 p refs

(Contract NAS1-16282)

(NASA-CR-165804) Avail: NTIS HC A03/MF A01 CSCL 09B

The recovery of the three dimensional structure of visible surfaces depicted in an image by emphasizing the role of geometric cues present in line drawings, was studied. Three key components are line classification, line interpretation, and surface interpolation. A model for three dimensional line interpretation and surface orientation was refined and a theory for the recovery of surface shape from surface marking geometry was developed. A new approach to the classification of edges was developed and implemented signatures were deduced for each of several edge types, expressed in terms of correlational properties of the image intensities in the vicinity of the edge. A computer program was developed that evaluates image edges as compared with these prototype signatures. E.A.K.

N82-17898*# Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.

STOCHASTIC CONTROL SYSTEM PARAMETER IDENTIFIABILITY

Chih-hsiao Lee and Charles J. Herget May 1975 141 p refs

(Contract NCAR-304-402)

(NASA-CR-166300; ISU-ERI-AMES-75134) Avail: NTIS HC A07/MF A01 CSCL 09B

The parameter identification problem of general discrete time, nonlinear, multiple input/multiple output dynamic systems with Gaussian white distributed measurement errors is considered. The knowledge of the system parameterization was assumed to be known. Concepts of local parameter identifiability and local constrained maximum likelihood parameter identifiability were established. A set of sufficient conditions for the existence of a region of parameter identifiability was derived. A computation procedure employing interval arithmetic was provided for finding the regions of parameter identifiability. If the vector of the true parameters is locally constrained maximum likelihood (CML) identifiable, then with probability one, the vector of true parameters is a unique maximal point of the maximum likelihood function in the region of parameter identifiability and the constrained maximum likelihood estimation sequence will converge to the vector of true parameters. S.L.

N82-17899# Sheffield Univ. (England). Dept. of Control Engineering.

CONTROLLER DESIGN FOR UNKNOWN MULTIVARIABLE SYSTEMS USING MONOTONE MODELING ERRORS

D. H. Owens and A. Chotai Feb. 1981 52 p refs

(Grant SRC-GR/B/23250)

(RR-144) Avail: NTIS HC A04/MF A01

The problem of controller design for an unknown discrete or continuous multivariable system in the frequency domain based on open-loop step response data alone is considered. The approach is based on the use of simple approximate plant models possessing the property that the resulting error in modeling the plant open-loop step response is both monotonic and sign definite as a function of time. In such circumstances the frequency domain properties of the approximating feedback system and the error involved in predicting steady state characteristics is sufficient data to predict the stability of the real feedback system. If integral controller elements are included, the results also provide sufficient conditions for exact tracking of step demands. Under certain circumstances, the technique has strong connections with the well-known inverse Nyquist array design method and can be regarded in part as a modification and generalization of that technique to cope with unknown interaction dynamics. Author

N82-17900# Fondazione Ugo Bordoni, Rome (Italy).

CQNA: CLOSED QUEUEING NETWORK ANALYZER

Mauro Brizzi and Davide Grillo Sep. 1980 16 p refs Presented at Tech. Conf. on Meas., Modeling and Evaluation of Computer Systems, Juelich, West Germany, 23-25 Feb. 1981

(FUB-48-1980) Avail: NTIS HC A02/MF A01

The package CQNA-2 allows the computation of metrics related to queueing networks. The networks that can be analyzed belong to a subset of the well known BCMP class, main characterizations being fixed population size ('closed network' assumption), state independent service rates, and stations with one of the following service disciplines: FCFS, LCFS-PR and RR-PS. The package is an extended and thoroughly revised edition of CQNA-1. The use of the package requires mapping of the queueing network to be investigated into its CQNA-2 counterpart. The mapping is quite straightforward and guidelines and examples are reported. Keys for controlling the degree of detail associated to the production of metrics are made available. J.M.S.

N82-17901# Texas Univ. at Arlington. Center for Cybernetic Studies.

QUASI-NEWTON METHODS CONVERGE AT THE GOLDEN SECTION RATE

J. Barzilai Aug. 1981 13 p refs

(Contract N00014-75-C-0569; NR Proj. 047-021)

(AD-A106683; CCS-RR-403) Avail: NTIS HC A02/MF A01 CSCL 12/1

Newton's method for the minimization of f: R to the n power yields R requires computation and inversion of the Hessian matrix at each iteration. Quasi-Newton methods approximate the Hessian or tis inverse by first order (i.e., gradient) information. These methods extend the classical secant (of False Position) method for $n > 1$. They are known to converge to the solution superlinearly. Thus, it is commonly accepted that the price paid for the approximation of the Hessian by gradient information is a reduction from second order to superlinear convergence. It is proven that the rate of convergence of a class of quasi-Newton methods, without line search and without restart, is given by the golden section ratio. J.D.H.

N82-17902# Oxford Univ. (England). Dept. of Engineering Science.

A DISCRETE-TIME MULTIVARIABLE CRITERION FOR LIMIT CYCLE PREDICTIONS

B. Kouvaritakis and R. Cameron (Bradford Univ., England) 1981 13 p refs Sponsored by Science and Engineering Research Council

(OUEL-1369/81) Avail: NTIS HC A02/MF A01

The use of circulant matrices in the study of the steady state response of discrete time systems to periodic inputs is discussed. System description applied to a nonlinear feedback configuration enables the derivation of simple sufficient conditions for the nonexistence of limit cycles. Application of the usual loop transformation to scalar systems recovers the classical circle criterion. The approach can also be applied to multivariable systems. However, instead of circulant matrices, circulant block matrices which are not normal are dealt with; the loop transformation is no longer straightforward. Suitable bounds on the numerical range of the loop transformed linear operator in terms of bounds on the numerical range of the original system are proposed. It is then possible to derive a multivariable circle type criterion with a Nyquist interpretation. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-17903 State Univ. of New York at Stony Brook.

RIEMANNIAN FIBRATIONS OF EUCLIDEAN SPACES Ph.D. Thesis

I-Ping Chu 1981 42 p

Avail: Univ. Microfilms Order No. 8127105

Local and global properties of Riemannian fibrations of flat euclidean space over some complete Riemannian manifold were

studied. It is proved that every Riemannian fibration of R(n) over M(n-k), with connected fibers, has a totally geodesic flat fiber in R(n). All Riemannian fibrations of R(n) are classified in terms of group representations of R(k) in the orthogonal group O(n-K). Furthermore, it is shown that Riemannian foliations with 1 dimensional leaves, are fibrations and in one-one correspondence with (non-vanishing) Killing fields of R(n). Dissert. Abstr.

N82-17904 Institut d'Aeronomie Spatiale de Belgique, Brussels.
STOCHASTIC ASPECTS OF CLIMATIC TRANSITIONS: RESPONSE TO PERIODIC FORCING
C. Nicolis 1981 31 p refs Submitted for publication Sponsored in part by Inst. Internationaux de Physique et de Chimie
(Aeronomica-Acta-A-234-1981) Avail: Issuing Activity

The effects of a long time scale on climate dynamics are examined. The time dependent properties of the Fokker-Planck equation corresponding to a zero-dimensional climate model, showing bistable behavior and subject to a weak external periodic forcing, are analyzed. Conditions under which the response is amplified are found analytically. The 100,000 year eccentricity variation of the Earth's orbit, connected with glaciation cycles, was simulated. Although the amplitude of the forcing was small, response amplitude changed dramatically in the presence of fluctuations due to changes in climatic potential and the time scale related to the variance of the fluctuations. Theoretical and numerical analyses of glaciation cycle periodicity agree well. Author (ESA)

N82-17905# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TWO THEOREMS ON THE DECOMPOSITION OF A PARA-UNITARY FUNCTION INTO A SUM OF TERMS WITH UNIFORM ARGUMENT
Plinio Tissi Sep. 1981 8 p refs Submitted for publication
(INPE-2217-PRE/015) Avail: NTIS HC A02/MF A01

The design of band separation networks is based upon the decomposition of a rational paraunitary (RPU) function q(s) into a sum of terms which possess, at each frequency s = iw, the same argument phi(w). The first theorem presents a sufficient condition on q(s) for the existence of such a decomposition. The second theorem presents the general solution to the problem of finding q(s), when the cross over frequencies and the respective asymptotic slopes are given. S.L.

N82-17906# Bonn Univ. (West Germany). Physikalisches Inst.
REGULARIZATION PROCEDURE FOR STRING FUNCTIONALS
T. Filk Sep. 1981 53 p refs
(HE-81-16; ISSN-0172-8733) Avail: NTIS HC A04/MF A01

A regularization for the partition function of string models, i.e., theories for fields defined on two dimensional manifolds, is proposed. One and two-loop contributions are shown to be finite in a large class of theories and no counter terms are required although these theories are nonrenormalizable in the sense of the usual power counting arguments. Plausibility arguments are given that even in higher corrections a large class of graphs, if not all, might turn out to be finite. Author

N82-17907# Naval Research Lab., Orlando, Fla. Underwater Sound Reference Detachment.
COMPLEX ROOT-FINDING PROGRAM WITH APPLICATION TO THE DISPERSION RELATION OF WAVES PROPAGATING IN A FLUID LOADED PLATE Interim Report
P. S. Dubbelday (Oak Harbour Marine Associates, Southport, Fla.) Washington 20 Nov. 1981 48 p refs
(Contract N00173-79-D-0004; Grant NSF SPI-80-13287; RR0110842)
(AD-A107631; NRL-MR-4559) Avail: NTIS HC A03/MF A01 CSCL 12/1

A method of finding complex roots in described, applicable to the situation where the given equation depends on a parameter in such a way that there exists a real root for a certain value of this parameter. This real root should be determined first by a real root finding routine. By incrementing the parameter by adjustable steps to the desired value, the progression of the corresponding root can be followed from the real axis into the complex plane. Alternately, this method can be applied to the case where it is desired to refine an approximate complex root obtained by other means, or track its progression through the complex plane when a parameter of the equation is varied. The method is a two dimensional counterpart to the one dimensional technique whereby the change of sign of the pertinent function delimits the location of a root. The complex root is similarly enclosed in a nested set of squares of diminishing size. The method is illustrated by a typical example, the dispersion relation for the propagation of straight crested waves in a homogeneous plate. GRA

N82-17908# Missouri Univ. -Columbia. Dept. of Statistics.
DUAL CONVEX CONES OF ORDER RESTRICTIONS WITH APPLICATIONS
Richard L. Dykstra Sep. 1981 25 p refs
(Contract N00014-78-C-0655)
(AD-A108126; TR-111) Avail: NTIS HC A02/MF A01 CSCL 12/1

The concept of closed convex cones in finite dimensional Euclidian space and their duals has proven to be a useful construct. Here dual cones are exhibited for specific closed, convex cones including those pertaining to starshaped orderings and concave (convex) functions. Applications include finding projections involving starshaped orderings, generalizations of Kimball's inequality, an inequality for concave (convex) functions and a characterization of certain kinds of positive dependence. GRA

N82-17909# Harvard Univ., Cambridge, Mass. Dept. of Statistics.
ROBUST PRINCIPAL COMPONENTS AND DISPERSION MATRICES VIA PROJECTION PURSUIT
Zhonglian Chen and Guoying Li Sep. 1981 19 p refs
(Contract N00014-79-C-0512; Grant NSF MCS-79-08685)
(AD-A107827; PJH-8) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper discusses a new kind of robust procedure for estimating covariance/correlation matrices and their principal components. Robust eigenvectors and eigenvalues of a covariance matrix are obtained by the projection pursuit method (PP) with robust variance as a projection index. Monte Carlo simulation results show that the best of the three projection pursuit type procedures introduced in this study compares favorably with approaches based on M-estimators of covariance: the estimate obtained by the new procedure has about the same bias and variance as the best M-estimators, and a somewhat better breakdown point. Author (GRA)

N82-17910# Harvard Univ., Cambridge, Mass. Dept. of Statistics.
PROJECTION PURSUIT
Peter J. Huber Aug. 1981 24 p refs
(Contract N00014-79-C-0512; Grant NSF MCS-79-08685)
(AD-A107817; PJH-6) Avail: NTIS HC A02/MF A01 CSCL 12/11

Projection pursuit (PP), which goes back to Kruskal and Friedman and Tukey, is discussed from a conceptual point of view. Originally, it was merely concerned with finding 'interesting' projections to aid the visual analysis of high dimensional data. It will be argued that there is a very general concept behind PP, having a much broader scope than anticipated by its originators. In its most important aspect it is concerned with finding least normal projections of the data, and it has ramifications reaching into topics as varied as robust covariance estimation, factor analysis, nonparametric signal detection, computer tomography and Hilbert's 13th problem. Author (GRA)

N82-17911# Rochester Inst. of Tech., N. Y.
EFFECT OF RECORD LENGTH ON THE CORRELATION OF COMPLEX EXPONENTIALS
Tapan K. Sarkar, Joshua Nebat (Syracuse Univ., N.Y.), Donald D. Weiner (Syracuse Univ., N.Y.), and Vijay K. Jain (Univ. of South Florida, Tampa) Nov. 1981 28 p refs
(Contract N00014-79-C-0598)
(AD-A107738; TR-81-4) Avail: NTIS HC A03/MF A01 CSCL 12/1

With the advent of the Singularity Expansion Method (SEM) there has been a great interest on the identification of a linear time-invariant system by a sum of complex exponentials. In this

paper the suitability of the exponential functions for modelling a finite time domain impulse response is examined. More specifically, we address the question of how long a data set does one need so that the record length behaves as if it were infinite. In other words, what is the minimum length of record required to resolve the various components of decaying exponentials. The answer to this question may yield data for a meaningful analysis. GRA

N82-17912# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.
RATIONAL MODELING BY PENCIL-OF-FUNCTION METHOD
Vijay K. Jain (Univ. of South Florida, Tampa), Tapan K. Sarker, and Donald D. Weiner (Syracuse Univ., N.Y.) Nov. 1981 34 p refs
(Contract N00014-79-C-0598; NR Proj. 371-014)
(AD-A107741; TR-81-7) Avail: NTIS HC A03/MF A01 CSCL 20/3

Pole-zero modeling of signals, such as an electromagnetic-scatterer response, is considered in this paper. It is shown by use of pencil-of-functions theorem that (a) the true parameters can be recovered in the ideal case (where the signal is the impulse response of a rational function H(z)), and (b) the parameters are optimal in the functional dependence sense when the observed data are corrupted by additive noise or by systematic error. Although the computations are more involved than in all-pole modeling, they are considerably less than those required in iterative schemes of pole-zero modeling. The advantages of the method are demonstrated by a simulation example and through application to the electromagnetic response of a scatterer. The paper also includes very recent and promising results on a new approach to noise correction. In contradistinction with spectral subtraction techniques, where only amplitude information is emphasized (and phase is ignored), we propose a method that (a) estimates the noise spectral density for the data frame, and then (b) performs the subtraction of the noise correlation matrix from the Gram matrix, of the signal. Author (GRA)

N82-17913# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.
APPROXIMATION BY A SUM OF COMPLEX EXPONENTIALS UTILIZING THE PENCIL OF FUNCTION METHOD
Tapan K. Sarkar, Donald K. Weiner (Syracuse Univ.), and Vijay K. Jain (University of South Florida, Tampa) Nov. 1981 23 p refs
(Contract N00014-79-C-0598, RR0210101)
(AD-A107742; TR-81-8) Avail: NTIS HC A02/MF A01 CSCL 12/1

The approximation of a function by a sum of complex exponentials, in general, is a nonlinear optimization problem. The optimization problem, however, is linearized through the application of the pencil of function method. This noniterative method yields the best exponential approximation for a given order of approximation. The method differs radically from the classical Wiener least squares approach in the sense that exponents calculated by the pencil of function method are directly proportional to the integrated squared error in the approximation. As the integrated squared error approaches zero, the exponents calculated by the pencil of function method approach the best least squares exponents in a continuous fashion. Among the advantages of the method are its natural insensitivity to noise in the data and explicit determination of the signal order. Examples are presented to illustrate the stability of this technique especially when noise is present in the data. GRA

N82-17914# California Univ., Berkeley. Operations Research Center.
TWO PAPERS ON RECURSIVE EVALUATION OF COMPOUND DISTRIBUTIONS
Willian S. Jewell and Bjorn Sundt Jul. 1981 48 p refs
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A107912; ORC-81-20) Avail: NTIS HC A03/MF A01 CSCL 12/1

The first paper, entitled further Results on Recursive Evaluation of Compound, is discussed. A recent by Panjer provides a recursive algorithm for the compound distribution of aggregate claims when the counting law belongs to a special recursive family. In the present paper we first give a characterization of this recursive family, then describe some generalizations of Panjer's result. The second paper, entitled Improved Approximations for the Distribution of a Heterogeneous Risk Portfolio, is discussed. A traditional actuarial method for the difficult task of finding the exact distribution of a heterogeneous portfolio approximates the distribution with a compound Poisson law with identically distributed risks. This paper shows that a Binomial compound law provides a better match to the second moment of the distribution, thus giving a better approximation, while retaining a simple, recursive algorithm for calculating the distribution. A modified Binomial compound law further refines the approximation, with slight additional work. GRA

N82-17915# California Univ., Berkeley. Dept. of Industrial Engineering and Operations Research.
A SIMPLE HEURISTIC APPROACH TO SIMPLEX EFFICIENCY
Sheldon M. Ross Aug. 1981 12 p refs
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A107913; ORC-81-21) Avail: NTIS HC A02/MF A01 CSCL 12/1

Consider the standard linear program: Minimize c x-subject to: A x = b, x greater than or equal to 0, where A is an m x n matrix. The simplex algorithm solves this linear program by moving from extreme point of the feasibility region to a better (in terms of the objective function c x) extreme point (via the pivot operation) until the optimal is reached. In order to obtain a feel for the number of necessary iterations, we consider a simple probabilistic (Markov chain) model as to how the algorithm moves along the extreme points. At first we suppose that if at any time the algorithm is at the jth best extreme point then after the next pivot the resulting extreme point is equally likely to be any of the j - 1 best. Under this assumption, we show that the time to get from the Nth best to the best extreme point has approximately, for large N, a Poisson distribution with mean equal to the logarithm (base e) of N. We also consider a more general probabilistic model in which we drop the uniformity assumption and suppose that when at the jth best the next one is chosen probabilistically according to weights wi, i = 1, ..., j - 1. Author (GRA)

N82-17916# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
NSWC/DL LIBRARY OF MATHEMATICS SUBROUTINES
Alfred H. Morris, Jr. Oct. 1981 235 p Supersedes NSWC/TR-79-338
(AD-A108106; NSWC/TR-81-410; NSWC/TR-79-338) Avail: NTIS HC A11/MF A01 CSCL 12/1

The NSWC/DL library is a library of general-purpose FORTRAN subroutines that provide a basic computational capability in a variety of mathematical activities. Although intended for use on the CDC 6000 series computers, emphasis has been placed on the transportability of the codes. Subroutines are available in the following areas: Elementary Operations, Geometry, Special Functions, Polynomials, Solutions of Nonlinear Equations, Vectors, Matrices, Sparse Matrices, Eigenvalues and Eigenvectors, Least Squares Solutions of Linear Equations, Optimization, Transforms, Approximation of Functions, Curve Fitting, Surface Fitting over Rectangular Grids, Surface Fitting over Arbitrarily Positioned Data Points, Numerical Integration, Ordinary Differential Equations/Initial Value Problems, and Random Number Generation. Author (GRA)

N82-17917# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
STABILITY ANALYSIS OF NUMERICAL METHODS FOR VOLTERRA INTEGRAL EQUATIONS WITH POLYNOMIAL CONVOLUTION KERNELS
S. Amini (Manchester Univ., England), C. T. H. Baker (Manchester Univ., England), P. J. vanderHouwen, and P. H. M. Wolkenfelt Aug. 1981 28 p refs Submitted for publication
(MC-NW-109/81) Avail: NTIS HC A03/MF A01

Direct quadrature methods as well as classical and modified Runge-Kutta methods are applied to a class of test equations with polynomial convolution kernels yielding structured systems of equations. Exploiting the structure of the results obtained in the stability analysis for a basic test equation, finite recurrence relations which make it possible to relate the stability properties

of the numerical methods to the location of the zeros of appropriate stability polynomials were derived. Author (ESA)

N82-17918# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
SMOOTHING AND COARSE GRID APPROXIMATION PROPERTIES OF MULTIGRID METHODS
W. J. A. Mol Aug. 1981 23 p refs
(MC-NW-110/81) Avail: NTIS HC A02/MF A01

Smoothing processes, which are used in multigrid methods, are analyzed with the smoothing analysis of Brandt. The smoothing processes are applied to model problems: the Poisson, anisotropic diffusion and convection diffusion equations. An estimate is given of the Galerkin coarse grid approximation. These and other theoretical results, in comparison with experiments with multigrid methods, are remarked on. Numerical experiments show that these methods are efficient and robust in the sense that they do not need to be adapted to the problem at hand.
Author (ESA)

N82-17919# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Methods.
APPLICATION OF MULTIGRID METHODS FOR INTEGRAL EQUATIONS TO TWO PROBLEMS FROM FLUID DYNAMICS
H. Schippers Aug. 1981 27 p refs Submitted for publication
(MC-NW-111/81) Avail: NTIS HC A03/MF A01

Multigrid methods are applied in order to efficiently solve the nonsparse systems of equations that occur in the numerical solution of two problems: (1) calculation of potential flow around bodies; and (2) calculation of oscillating disk flow. Problem (1) is reformulated as a boundary integral equation of the second kind that is approximated by a first order panel method resulting in a full system of equations. This method is in widespread use for aerodynamic computations. Problem (2) is described by Navier-Stokes and continuity equations. By means of the von Karman similarity transformations, these equations are reduced to a nonlinear system of parabolic equations which are approximated by implicit finite difference techniques. From the periodic conditions in time, a nonsparse system of equations is obtained. For both these problems, the fast convergence of multigrid methods for integral equations is established by numerical experiments. Author (ESA)

N82-17920# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
ON THE CONTRACTIVITY OF A COMPLEX RUNGE-KUTTA SCHEME
J. G. Verwer Oct. 1981 7 p refs Submitted for publication
(MC-NW-112/81) Avail: NTIS HC A02/MF A01

An attempt to break the order barrier p < or = 1 for contractive Runge-Kutta schemes with a special Runge-Kutta scheme of order 2, containing a complex parameter, is made. The implicit Runge-Kutta method is recalled and a previous result is cited, i.e., if the method is contractive with respect to all f belonging to the class of all differential systems (y' - f (t, y), t > or = 0, y (0) = y sub 0) with respect to a given norm, where the given norm may be arbitrary, then its order of accuracy p is not > 1. Taking a complex backward Euler scheme as an example, the order barrier p < or = 1 is found to be in fact unavoidable. This is proven by a counter example. Author (ESA)

N82-17921# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
RIGOROUS HIGH SPEED SEPARATION OF ZEROS OF RIEMANN'S ZETA FUNCTION
J. vandeLune, H. J. J. teRiele, and D. T. Winter Oct. 1981 40 p refs
(MC-NW-113/81) Avail: NTIS HC A03/MF A01

The Riemann hypothesis was numerically investigated, using a FORTRAN/COMPASS program executed on a CDC system of two CYBER 750 computers. The strategy for finding the required number of sign changes of Z (t) in a Gram block of length L > or = Z is explained. Computation of Z (t) and error analysis are discussed. The program is given. Results, obtained by extensive computations, show that the first 200,000,001 zeros of the Riemann zeta function, zeta (s), in the critical strip are simple and lie on the line Re (s) = 1/2. This extends Brent's previous bound of 156,800,001. Author (ESA)

N82-17922# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
ANOTHER PROOF FOR THE COMPLETENESS OF A RULE FOR THE FAIR TERMINATION OF GUARDED COMMANDS AND ANOTHER RULE FOR THEIR JUST TERMINATION
Daniel Lehmann (Hebrew Univ.) Sep. 1981 9 p refs Submitted for publication
(MC-IW-178/81) Avail: NTIS HC A02/MF A01

An iterative guarded command C of the type: * open brackets d'Alembertian operator i belongs to I for B sub i tends to C sub i close brackets, where I is a set of indexes, the B sub i's are Boolean expressions (without side effects), and the C sub i's are commands, is considered. There is no assumption of fairness for the successive executions of each C sub i. The assumption of fairness at the outer level is made by assuming that if, in the course of executing C, an infinite number of times at the beginning of the body of the loop with B sub i being true is obtained, then the command C sub i, is chosen for execution an infinite number of times. The completeness of a rule for fair termination is proved. The result is an almost immediate consequence of a previous completeness result. Another completeness result suggests a rule for proving just termination of loops. It is different from a proposed proof rule dealing with fairness. It is also shown to be sound and complete.
Author (ESA)

N82-17923# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
PRINCIPAL COMPONENTS BIPILOTS AND ALPHA AND BETA DIVERSITY
Cajo J. F. terBraak Jan. 1981 19 p refs
(Contract IWIS-TNO-07.6.17806)
(IWIS-A-81-ST-23-15) Avail: NTIS HC A02/MF A01

Noncentered principal components analysis (PCA) on proportion data are used in order to give site ordinations that display approximate alpha diversities of sites and beta diversities of groups of sites, as measured by Simpson index and mean squared Euclidean distance. Species centering gives a better approximation to beta diversities; alpha diversities can still be visualized, if the true origin is projected into the plane of the ordination. The approximate species composition of each site can be visualized if the site ordination is combined with a species ordination. Noncentered and species centered distance biplots of diatom samples taken from pools in the 1920's and 1978 are compared. These plots show the approximate change in the pools since the 1920's: impoverishment in species composition and decrease in alpha diversity of pools as well as in beta diversity among pools. Species centered PCA yield more accurate approximations. Distortion is least in low diversity samples.
Author (ESA)

N82-17924# Loughborough Univ. of Technology (England).
THE ITERATIVE SOLUTION OF A NON-LINEAR FREDHOLM INTEGRAL EQUATION ARISING FROM A CHEMICAL REACTOR PROBLEM
G. A. Evans, J. Hyslop, and A. P. G. Morgan Mar. 1981 17 p refs
(MATHS-Res-156) Avail: NTIS HC A02/MF A01

Material balance equations for tubular reactors with axial diffusion are discussed. For a Fredholm equation, the equation for the residual at any stage of the iteration is reduced to a linear integral equation for the required perturbation, using Newton's method. This equation is then solved by using a low order expansion in terms of Chebyshev polynomials. The numerical integrations required in the basic iterative process are carried out by the Clenshaw-Curtis quadrature prescription. Results are compared with conventional solutions of the parent differential equation and also with attempts at direct iterative solution of the integral equation by standard Neumann-Liouville series. The method is rapid and accurate in areas where conventional algebraic approaches are difficult. Author (ESA)

N82-17925# Oxford Univ. (England). Dept. of Engineering Science.
COMPLEX ALIGN: A TECHNIQUE FOR THE CHARACTER-

ISTIC LOCUS METHOD OF DESIGN
B. Kouvaritakis Jul. 1981 14 p refs Sponsored by Science and Engineering Research Council
(OUEL-1366/81) Avail: NTIS HC A02/MF A01

Eigenvector alignment techniques which play an important role in the characteristic locus design of commutative controllers for multivariable systems are considered. The effectiveness of this design procedure depends on the degree of commutativity between the open loop transfer function matrix operator, G (s), and the construction of a controller, K (s), at some specific frequency of interest, s = s sub 0. This in turn depends on the degree of success of the least squares algorithm, ALIGN, which generates the real vector approximations to the eigenvectors of G (s sub 0). In order to extend the flexibility and effectiveness of the technique, the approximation of eigenvector pairs by constant complex conjugate vectors is examined. The COMPLEX ALIGN algorithm for the optimum design of the real and imaginary part of the eingenvector approximations is proposed. Author (ESA)

N82-17926# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
TWO ESTIMATION METHODS FOR NONSTATIONARY SPECTRA [DEUX METHODES D'ESTIMATION DE SPECTRES NON STATIONNAIRES]
Yves grenier Oct. 1981 16 p refs In FRENCH
(ENST-D-81006) Avail: NTIS HC A02/MF A01

The methods are the Burg method where the identified model has the structure of a grid filter and the Prony-Pisarenko method where the model is a null input system whose output is distorted by observation. Both methods make the hypothesis that the model parameters to be identified evolve in a space generated by a small number of time functions f sub o (t)... f sub d (t). The theoretical framework of evolutive spectrum estimation is described and an algorithm that permits calculation of the estimator is given for each method. Author (ESA)

N82-17927# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
THE STABLE PEDIGREES OF CRITICAL BRANCHING POPULATIONS
Olle Nerman 1981 29 p refs Sponsored by Swedish Natural Science Research Council
(CTH-Math-1981-15) Avail: NTIS HC A03/MF A01

The asymptotical sizes and compositions of critical general branching processes conditioned on nonextinction were treated. Results for processes counted with random characteristics allowed to depend on the whole daughter processes are given. These are used to derive conditional limit theorems for the pedigrees of randomly sampled individuals among populations counted with 0-1-valued characteristics. The limiting stable pedigrees have independence structures and are derived from the original branching laws. Author (ESA)

N82-17928# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
A STUDY OF ORDERS IN QUATERNION ALGEBRAS
J. Brzezinski 1981 28 p refs
(CTH-Math-1981-16) Avail: NTIS HC A03/MF A01

For each A-order Lambda in a generalized quaternion algebra H over the field of fractions F of a Dedekind ring A, its Gorenstein closure is defined. This is a Gorenstein A-order G (Lambda) in H such that Lambda is the least A-order containing (b underlined) (Lambda) G (Lambda) for an ideal (b underlined) (Lambda) in A. A list of all Gorenstein orders (and consequently of all orders) in quaternion algebras over a complete A is given where for each Gorenstein A-order Lambda is a construction of a minimal chain of Gorenstein orders begining with A and ending with a hereditary order. Author (ESA)

N82-17929# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
ON L SUB P-DECAY AND SCATTERING FOR NONLINEAR KLEIN-GORDON EQUATIONS
Philip Brenner 1981 42 p refs
(CTH-Math-1981-17) Avail: NTIS HC A03/MF A01

Previous results on scattering and decay are extended to a larger class of nonlinearities and to dimensions > 3. In particular, for nonlinearities of the type (modulus u) (sup rho-1) (u) the existence of scattering states is proved for $1 + 4/n < \rho < 1 + 4\gamma_{n}/(n-2)$, where $\gamma_{n} = 1$ for < 0 or $= 10$ and $\gamma_{n} = n/(n+1)$ for $n > 10$. No quantitative restrictions are placed on the data. Earlier results of this type were only known for $n = 3$ and $8/3 < \rho < 5$. Author (ESA)

N82-17930# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
ASYMPTOTIC BEHAVIOR OF THE BOLTZMANN EQUATION WITH INFINITE RANGE FORCES
Leif Arkeryd 1981 13 p refs
(CTH-Math-1981-18) Avail: NTIS HC A02/MF A01

Previously obtained existence results for the space-homogeneous, nonlinear Boltzmann equation for a class of encounters with infinite range, including inverse Kth power molecules with $k > 3$, are considered. These solutions are proved to converge in the weak L sup 1 sense for $k > 5$ to Maxwellian distributions when t tends to infinity. Also, the higher moments converge to those of the relevant Maxwellian. The method of proof relies on nonstandard techniques. Author (ESA)

N82-17931 Bowling Green State Univ., Ohio.
EXACT DISTRIBUTION OF CERTAIN GENERAL TEST STATISTICS IN MULTIVARIATE ANALYSIS Ph.D. Thesis
Jen Tang 1981 108 p
Avail: Univ. Microfilms Order No. 8127345

In multivariate analysis, many statistics and likelihood ratio test (LRT) criteria are distributed as products of several independent tests random variables. The exact distribution of the type B variable is obtained in general forms as a mixture of weighted gamma distributions as well as a mixture of beta distributions. Some important cases are studied in detail. The exact distribution of Bartlett's test statistic for equality of variances of normal populations is obtained. The problem for equal sample sizes case of the corresponding multivariate Bartlett's test was completely solved by obtaining the exact distribution in an easily computable form and providing tables of its percentage points. The exact distribution of a statistic with Box's (1949) generalized moment function is obtained. Dissert. Abstr.

N82-17932 Clemson Univ., S.C.
PARAMETER ESTIMATION IN A REPRODUCING KERNEL HILBERT SPACE FOR LINEAR HEREDITARY SYSTEMS Ph.D. Thesis
Stephen Lewis Benz 1981 86 p
Avail: Univ. Microfilms Order No. 8126926

Often a model for a physical system contains parameters that must be adjusted to obtain a best fit to observed data. Two methods are presented here for the estimation of coefficient and delay parameters in linear hereditary systems. The models $h = f + B\gamma h$ and $h = A\gamma f$ for linear hereditary systems are studied within the following context. The input output pair (f,h) is approximated by functions from the space of Hellinger integrable functions which is shown to be a reproducing kernel Hilbert space. Using properties of this space, representations for the operators $B\gamma$ and $A\gamma$ are developed in terms of the unknown vector of parameters gamma. A discretization of each of the models is then introduced on a finite dimensional subspace of the space of Hellinger integrable functions. The discretization permits the development of suitable estimation methods based on the observations. It is shown that under appropriate conditions the discrete models converge to the continuous models. Dissert. Abstr.

N82-17933 State Univ. of New York at Stony Brook.
DERIVATION OF QUASI-NEWTON UPDATES FOR NONLINEAR EQUATIONS AND UNCONSTRAINED OPTIMIZATION Ph.D. Thesis
Douglas Edward Salane 1981 102 p
Avail: Univ. Microfilms Order No. 8126236

The derivation of quasi-Newton algorithms for solving nonlinear equations and unconstrained optimization problems is discussed. The use of those iterative methods to derive some of the well known quasi-Newton updates used in algorithms for solving nonlinear equations is demonstrated. The same techniques are then shown to provide a unified derivation of the symmetric

minimum norm updates used in unconstrained optimization algorithms. A modification to existing quasi-Newton updates which is designed to improve the performance of these methods when they are used to minimize functions which deviate from quadratic behavior is examined. The modified update present reduces to a classic quasi-Newton update when applied to a quadratic functional and is locally and superlinearly convergent when used to minimize a suitably restricted nonlinear functional. Numerical evidence suggests that the new methods are competitive with existing quasi-Newton algorithms. Dissert. Abstr.

N82-17934 Colorado State Univ., Fort Collins.
MULTIGRID METHODS FOR DIFFERENTIAL EIGENVALUE AND VARIATIONAL PROBLEMS AND MULTIGRID SIMULATION Ph.D. Thesis
John Wilbur Ruge 1981 87 p
Avail: Univ. Microfilms Order No. 8126450

The use of multigrid methods for solving a wide variety of problems efficiently is increasing. Application of multigrid to each new class of problems yields new information about the method itself which can extend to other areas. Work on both the practical and the theoretical aspects of the method is presented. A method for finding the first several eigenvalues of a self adjoint, elliptic differential operator is discussed. The numerical experiments indicate that this method is very efficient. A proof of convergence for a class of variational problems is studied. The proof is quite simple, and it is hoped that it will help close the gap between provable and observed convergence rates. A simple program simulating multigrid which is a powerful tool for the study of multigrid and is application to more complex problems is discussed. It can be used in place of conventional relaxation or solution schemes within target programs and, although less efficient than multigrid, can give an indication of how multigrid would perform in that context. Dissert. Abstr.

N82-17935 Michigan State Univ., East Lansing.
FINITE ELEMENT METHODS FOR PERIODIC SOLUTIONS OF DYNAMICAL SYSTEMS Ph.D. Thesis
Mohamed Shendy El-Mandouh 1981 130 p
Avail: Univ. Microfilms Order No. 8126497

The problem of computing the normal modes of nonlinear Hamiltonian systems is discussed. The normal modes are assumed to exist and depend continuously on the total energy E for E in some range. The finite element method, in which the time variable is discretized, is applied to such systems and transforms the mathematical problem that is governed by nonlinear differential equations into one governed by a set of nonlinear algebraic equations which is to be solved for various values of E. The main contribution was to establish the existence of solutions of the nonlinear algebraic finite element equations by a contraction mapping argument. This was done by relating the Jacobian of the discrete problem to that of the exact problem. Furthermore, if the exact problem has an isolated branch of solutions for some E in a neighborhood of E sub 0 then, correspondingly the finite element solution that exists for E sub 0 is also isolated and can be uniquely continued, for small mesh size, in a neighborhood of E sub 0. Algorithms for implementing the numerical work are discussed and some illustrative numerical results are also presented. Dissert. Abstr.

N82-17936 Michigan Univ., Ann Arbor.
F-PURITY AND RATIONAL SINGULARITY Ph.D. Thesis
Richard Scott Fedder 1981 66 p
Avail: Univ. Microfilms Order No. 8125109

Singularities which are F-pure (respectively, F-pure type) are investigated. A ring R of characteristic p is F-pure if for every R module M,0 yields direct product of M and R yields direct product of M and (1)R is exact where (1)R denotes the R-algebra structure induced on R by the Frobenius map. F-pure type is defined in characteristic 0 by reducing to characteristic p. When R = S/I is the quotient of a polynomial ring S, it is proven that R is F-pure at the prime ideal Q. Known results about rational singularities are paralleled. Classifying F-pure singularities for complete interaction ideals, it is also proven, can be reduced to classifying such singularities for hypersurfaces. Dissert. Abstr.

N82-17937 North Carolina Univ. at Chapel Hill.
COMPOUND FUNCTION AND LINEAR MODEL METHODS FOR THE MULTIVARIATE ANALYSIS OF ORDINAL CATEGORICAL DATA Ph.D. Thesis
Kofi Alavi Semenya 1981 226 p
Avail: Univ. Microfilms Order No. 8125618

A well recognized aspect of the analysis of ordinal categorical data is that a considerable gain in efficiency is, in principle, feasible for tests which use the information in the scale of the categories rather than the conventional Pearson Chi-Square test of homogeneity. A broad class of hypotheses involving subpopulation differences is expressed in terms of generalized mean scores and/or parameters of underlying parametric models and generalized measures of association. Estimates of these quantities are formulated in terms of functions of the observed data. The proportional hazards model is discussed. A set of rank scores are developed which are analogous to those corresponding to the Mantel-Haenszel test for survival data. Recommendations are given regarding the relative advantages and disadvantages of the respective methods for a range of potential applications. Dissert. Abstr.

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-17938 Michigan Univ., Ann Arbor.
A METHOD OF NONPARAMETRIC SURVIVAL ANALYSIS FOR DOUBLY CENSORED DATA Ph.D. Thesis
Dianne Madelyn Schwartz Finkelstein 1981 109 p
Avail: Univ. Microfilms Order No. 8125110

A model and method of analysis for survival time data which can be right and/or left censored is presented. The covariates are treated as random variables. Nonparametric estimates are found for the survival distribution, G(s) = P(s>s). The estimates are computed using a general E-M algorithm. This method generalizes easily to left or right censored and tied data, and offers an alternative to the widely accepted Cox proportional hazards model. This approach yields a broadly applicable methodology for nonparametric estimation of the survival distribution. Dissert. Abstr.

N82-17939 North Carolina Univ. at Chapel Hill.
A CONTINUOUS SHADING SCHEME FOR TWO-VARIABLE MAPPING Ph.D. Thesis
Laurence William Carstensen, Jr. 1981 177 p
Avail: Univ. Microfilms Order No. 8125563

A continuous-tone approach to bivariate mapping is presented and tested. The key is made much simpler with a logic that is easy to internalize. In the testing performed, the continuous-tone monochrome map allowed better subject estimates of the encoded data, and better estimates of the relationship between the two variables portrayed than the U.S. Bureau of the Census maps which used a four by four color classification scheme. In regionalization tests using the monochrome maps, subjects performed at more than adequate levels. Overall, the results of the study validate the hypothesis that continuous shading can represent bivariate distributions, and call for further research into the information content-simplification balance which is so critical to two variable mapping. Dissert. Abstr.

N82-17940# Missouri Univ. -Columbia. Dept. of Statistics.
A ROBUST NONPARAMETRIC LIKELIHOOD RATIO TEST
Richard L. Dykstra, Richard W. Madsen, and Kenneth Fairbanks Aug. 1981 22 p refs
(Contract N00014-78-C-0655)
(AD-A108124; TR-109) Avail: NTIS HC A02/MF A01 CSCL 12/1

The likelihood ratio principle is employed to suggest a nonparametric test for testing equality of two distributions against a stochastic ordering alternative. The test appears to be robust against a wide range of alternatives. Percentage points for sample sizes less than or equal to twenty are provided as well as a comparison of power values for the Kolmogorov-Smirnov and Mann-Whitney-Wilcoxon tests. Author (GRA)

N82-17941# Missouri Univ. -Columbia. Dept. of Statistics.
MULTIVARIATE HARMONIC NEW BETTER THAN USED IN EXPECTATION DISTRIBUTIONS Technical Report, Aug. 1981
A. P. Basu and Nader Ebrahimi Aug. 1981 20 p refs
(Contract N00014-78-C-0655; Grant NSF INT-80-09463)
(AD-A108125; TR-110) Avail: NTIS HC A02/MF A01 CSCL 12/1

Various definitions of multivariate harmonic new better than used in expectation (MHNBUE) life distributions are introduced and their interrelationship is studied. These are multivariate generalizations of the largest available univariate class of distributions with aging properties. Examples are given to illustrate these concepts. Various closure properties of MHNBUE distributions are proved. Author (GRA)

N82-17942# Missouri Univ. -Columbia. Dept. of Statistics.
P-VALUES FOR MULTI-STAGE AND SEQUENTIAL TESTS
Richard W. Madsen and Kenneth Fairbanks Oct. 1981 19 p refs
(Contract N00014-78-C-0655)
(AD-A108127; TR-112) Avail: NTIS HC A02/MF A01 CSCL 12/1

P-values are commonly given for ordinary single stage statistical tests. In this note we give a general method for calculating p-values for a large class of multi-stage and sequential tests. We also give some tables of p-values for multi-stage tests about the parameter of an exponential distribution when test plans from MIL-STD-781C are used. Author (GRA)

N82-17943# North Carolina Univ. at Chapel Hill. Office of Operations Research and Systems Analysis.
ACCELERATED CONVERGENCE IN THE SIMULATION OF COUNTABLY INFINITE STATE MARKOV CHAINS
George S. Fishman Sep. 1981 34 p refs
(Contract N00014-76-C-0302)
(AD-A107869; TR-81-4) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes a method of obtaining results from the simulation of a countably infinite state positive recurrent aperiodic Markov chain at a cost considerably below the cost required to achieve the same accuracy with pure random sampling. By reorganizing k independent epochs or tours simulated serially into k replications simulated in parallel, one can induce selected joint distributions across replications that produce the cost-saving benefits. The joint distributions follow from the use of rotation sampling, a special case of the antithetic variate method. The chains considered are of the band type so that for the state space S = (0,1,2,...) there exists an integer, delta, such that transition from a state i can move no further than to states i - delta and i + delta. The paper shows that an estimator of interest has variance bounded above by O(delta squared (ln k) to the 4th power/k squared) when using rotation sampling, as compared to a variance O(l/k) for independent sampling. Moreover, the mean cost of simulation based on rotation sampling has an upper bound O((delta ln k) squared) as compared to at least O(k) for independent sampling. The paper also describes how one can exploit special structure in a model together with rotation sampling to improve the bound on variance for essentially the same mean cost. GRA

N82-17944# Cambridge Univ. (England). Dept. of Engineering.
PERSON-BY-PERSON OPTIMAL SOLUTION TO THE DECENTRALISED LQG STOCHASTIC CONTROL PROBLEM WITH CONTROL SHARING INFORMATION PATTERN
H. M. Tan 1981 46 p refs
(PB82-113457; CUED/F-CAMS/TR-212-1981;
ISSN-0309-765X) Avail: NTIS HC A03/MF A01 CSCL 12A

The decentralized LQG stochastic control problem with control sharing information pattern, whereby controllers exchange controls but not observations, is considered. Previous work and their shortcomings are examined, and a person-by-person optimal solution is obtained. This solution is seen to be unique and linear in the information variables and represents the first feasible and complete solution satisfying the necessary conditions for optimality of this control sharing problem. GRA

N82-17945 Washington Univ., Seattle.
PROPORTIONAL HAZARDS MODEL WITH TIME-DEPENDENT COVARIATES: LARGE SAMPLE THEORY AND RELATED TOPICS Ph.D. Thesis
Steven Glenn Self 1981 124 p
Avail: Univ. Microfilms Order No. 8126142

The proportional hazards (PH) model is a regression model widely used in the analysis of failure time data. The estimator for the regression coefficients in the PH model most commonly used is the maximum partial likelihood estimator (MPLE). However, its consistency and asymptotic normality have been demonstrated only heuristically. Recently, Liu and Crowley and Tsiatis rigorously established the strong consistency and asymptotic normality of the MPLE for the special case of time-independent, almost-surely bounded covariates. Using the theory of weak convergence, the approach of Tsiatis was extended to rigorously demonstrate the strong consistency and asymptotic normality of the MPLE in the general case of time-dependent covariates. Approaches for outlier detection, residual plots and robust testing/estimation procedures for the PH model are also discussed. Dissert. Abstr.

N82-17946 Michigan Univ., Ann Arbor.
HYPOTHESIS TESTING IN CONTINGENCY TABLES WITH SMALL SAMPLES Ph.D. Thesis
Jean Lambert 1981 330 p
Avail: Univ. Microfilms Order No. 8125152

Solutions to the problem of small samples for hypothesis testing in a contingency table framework are presented. The impact of a variance estimator choice on the conservativeness or liberalism of the procedure with respect to the type 1 error is discussed. New continuity corrections for testing homogeneity in a (2 x 2) comparative trial with arbitrary sample sizes are proposed. These continuity corrections are based on the average interval between successive differences of binomial proportions. In a second step, unconditional of approximate exact tests for different sampling designs are derived. The sizes of these unconditional exact tests are then obtained by associating an estimated sampling distribution with an ordering criterion, i.e., a chi-squared test statistic, in order to construct an empirical cumulative distribution function on that statistic. Monte Carlo simulations are performed to study the closeness of the empirical significance level to the nominal significance level with the chi-squares corrected for the proposed continuity corrections. Formulas based on the proposed continuity corrections are derived for sample size determination. Dissert. Abstr.

N82-17947 Michigan Univ., Ann Arbor.
DIRECTION AND COLLINEARITY FACTORS IN GROWTH CURVE MODELS AND OTHER PROBLEMS IN DISCRIMINANT ANALYSIS Ph.D. Thesis
Thomas Michael Davis 1981 214 p
Avail: Univ. Microfilms Order No. 8125095

The exact direction and collinearity factors of Wilks's Lambda are extended to the growth curve model both when the discriminant function is in the space of the dependent variables and when it is in the space of the independent, or dummy, variables. The case in which only a submatrix of the parameters is of interest is dealt with, as is the case of more than one discriminant function. The hypothesis that the discriminant function is the same from one pair of populations to another is addressed. This hypothesis is equivalent to proportionally of differences in means. Exact criteria are derived for this hypothesis, for the value of a porposed constant of proportionally, and for the direction of a proposed constant of function. These criteria are generalized to the hypothesis that several pairs of groups share the same discriminant function. Dissert. Abstr.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-17948# Office of the Chief of Staff (Army), Washington, D. C. Management Directorate.
REFLECTIONS ON AIRCRAFT UNMASK RANGES
James J. Metzger and David C. Hardison 6 Oct. 1981 13 p

(AD-A107953) Avail: NTIS HC A02/MF A01 CSCL 15/3

An analytic representation is obtained of the range at which a terrain-following aircraft unmasks to an air defense site. The unmask range is expressed as a distribution that depends on a single parameter, the mean unmask range. That parameter is given as a function of terrain characteristics, aircraft height, and air defense site location. Author (GRA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-17949 Pennsylvania Univ., Philadelphia.
ON COMPOSITIONS OF MULTISETS Ph.D. Thesis
Rodica Eugenia Simion 1981 145 p
Avail: Univ. Microfilms Order No. 8127075

Three aspects of the compositions of multisets are studied. The logarithmic concavity of the sequence of numbers (omicron (vector n,k)) sub k of compositions of any multiset vector n into k nonempty parts, and its consequences are found. This is proved in the setting of Sturm sequences of polynomials associated with the elements of a poset. An order relation on the partitions of integers is induced by the comparability of their corresponding vectors (omicron(vector n,k)) sub k and it is shown how this order and the position of the mode of these vectors behave with respect to other orderings, previously known, on the partitions of integers. The question of determining a multiset from its number of compositions, and two related problems are studied. The problem of poset reconstruction from 'scarce' values of the zeta function is discussed. Dissert. Abstr.

N82-17950 Arkansas Univ., Fayetteville.
FUNDAMENTAL ORDER RELATIONS ON REGULAR SEMIGROUPS Ph.D. Thesis
Simon M. Goberstein 1981 97 p
Avail: Univ. Microfilms Order No. 8127293

An order relation < or = on a semigroup S is fundamental if an ordered semigroup (S, < or =) is o-isomorphic to a semigroup of functions (= partial transformations) on some set ordered by inclusion (i.e., extension) of functions. Fundamental orders on some significant classes of regular semigroups such as completely [O-]simple semigroups, normal bands of groups, inverse semigroups, orthodox semigroups with right regular and normal bands of idempotents are studied. All stable orders on inverse semigroups considered as algebras with two operations, multiplication and inversion, are described by means of fundamental orders on these semigroups. The structure of inverse semigroups having the natural order relations as the only nontrivial fundamental order are described. Dissert. Abstr.

N82-17951# DSM/nv Nederlandse Staatsmijnen, Geleen.
GENERALIZATION OF KRAMERS-KRONIG TRANSFORMS AND SOME APPROXIMATIONS OF RELATIONS BETWEEN VISCOELASTIC QUANTITIES
Henk C. Booij and Truus P. J. M. Thoone 21 Aug. 1981 23 p refs
(MS-1569) Avail: NTIS HC A02/MF A01

On the basis of some very plausible assumptions about the response of physical systems to stimuli, such as Boltzmann's superposition principle and the causality principle, it is shown that the following characteristics are obtained for the modulus and compliance functions: (1) they are analytic in the lower half of the complex frequency plane; (2) they are limited if the frequency tends to infinity; and (3) the real and imaginary parts are even and odd functions, respectively, of the frequency. It is demonstrated that the real and imaginary parts of every function satisfying these three requirements and without singularities on the real frequency axis, are interrelated by Kramers-Kronig transforms. Similar relations hold between the logarithm of the modulus and the argument of the function. Under certain conditions the Kramers-Kronig relations may be approximated by rather simple equations. For linear viscoelastic materials, for instance, approximate relations were obtained for the components of the complex dynamic shear modulus. Author

N82-17952# Commission of the European Communities, Ispra (Italy). Joint Research Centre.
FLUID-STRUCTURE COUPLING IN LAGRANGE-LAGRANGE AND EULER-LAGRANGE DESCRIPTIONS
A. V. Jones 1981 103 p refs Submitted for publication
(EUR-7424-EN) Avail: NTIS HC A06/MF A01

The principal finite difference methods employed in solving fluid-structure interaction problems are reviewed. The chief representations of the equations of motion of the fluid and structure and of their coupling are surveyed and the Lagrange-Lagrange and Euler-Lagrange representations are examined. The necessity of treating the structure in Lagrangian coordinates and the respective merits of the Lagrangian and Eulerian representations for the fluid are explained, both for coupling between continua and for coupling between a fluid and a thin shell. Analyses of the stability and numerical dissipation of the Lagrange-Lagrange and Euler-Lagrange coupling techniques in a very simple one dimensional problem are detailed to supply indicators as to stability and dissipation in more complex multidimensional situations and to bring out the theoretical complexity of seemingly simple coupling algorithms. A.R.H.

N82-17953# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Computer Science.
AN OPERATIONAL SEMANTICS FOR BONDED NONDETERMINISM EQUIVALENT TO A DENOTATIONAL ONE
R. Kuiper Jul. 1981 30 p refs Submitted for publication
(MC-IW-169/81) Avail: NTIS HC A03/MF A01

Dyadic nondeterministic choice is added to the programming language with recursive procedures used in de Bakker's monograph on program correctness. This leads to considerable changes in the operational semantics. The possible result of the execution of a program is no longer given as a single state, but as a set of possible states. Furthermore, the execution of a program is no longer given as a computation sequence, but as a set of possible computation sequences with tree-like properties. A natural operational semantics O, defined by a function Comp, where Comp yields for each program R and each state sigma a set of computation sequences, characterized by Cook equations, is presented. For this set of equations, in a topological setting, the existence of a unique solution and the equivalence of the operational semantics to the usual denotational one, defined by fixed point techniques, is proved. Author (ESA)

N82-17954 Michigan Univ., Ann Arbor.
COMBINATORIAL MAPS Ph.D. Thesis
Andrew Joseph Vince 1981 159 p
Avail: Univ. Microfilms Order No. 8125216

A purely combinatorial generalization of a map was formulated. Besides maps on orientable and non-orientable surface, these combinatorial maps include, as special cases, polytopes, the hypermaps, certain toroidal 'complexes', and higher dimensional analogues of maps. The concept of a combinatorial map is formulated in four equivalent ways: as an incidence structure, as a labeled graph, as a set of permutations and group theoretically. An agreeable outcome of the theory is that the cellular and embedding scheme approaches are naturally unified. Particular emphasis is placed on those combinatorial maps that are highly symmetric. By using a combinatorial analogue of covering space theory, coverings of a given combinatorial map are shown to be in one-to-one correspondence with permutation representations of a combinatorially defined homotopy group. This leads to an algorithm for generating all regular combinatorial maps that are cyclic coverings of a given regular combinatorial map. Dissert. Absr.

N82-17955 Auburn Univ., Ala.
SEMIGROUPS OF COLUMN STOCHASTIC MATRICES Ph.D. Thesis
Owen Campbell Litz 1981 54 p
Avail: Univ. Microfilms Order No. 8127299

An investigation of Green's relations for column stochastic matrices is made. Particular emphasis is placed on determining necessary and sufficient conditions for the A and L relations. This objective is achieved by dividing the set of column stochastic matrices into two categories: (1) column stochastic matrices in which negative entries are allowed, and (2) column stochastic matrices in which all entries must be nonnegative. Green's relations

for column stochastic matrices of the first type and Green's relations for column stochastic matrices of the second type are discussed. Necessary and sufficient conditions for two elements of any subsemigroup of semigroup of all nxn complex matrices to be L related. Several semigroup properties are studied. Necessary and sufficient conditions for a column stochastic matrix of either type to be left or right cancellable are obtained. It is shown that the set of matrices of the first type form a regular semigroup. Finally, given a column stochastic matrix of either type, a method for finding a column stochastic rank factorization is exhibited. Dissert. Abstr.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-17956# Rochester Inst. of Tech., N. Y. Dept. of Electrical Engineering.
AN ITERATIVE METHOD FOR SOLVING ELECTROSTATIC PROBLEMS
Tapan K. Sarkar and Sadasiva M. Rao Nov. 1981 21 p refs
(Contract N00014-79-C-0598; NR Proj. 371-014)
(AD-A107740; TR-81-6) Avail: NTIS HC A02/MF A01 CSCL 20/3

The method of steepest descent is applied to the solution of electrostatic problems. The relationship between this method and the Rayleigh-Ritz, Galerkin's, and the method of least squares is outlined. Also, explicit error formulas are given for the rate of convergence for this method. It is shown that this method is also suitable for solving singular operator equations. In that case this method monotonically converges to the solution with minimum norm. Finally, it is shown that the technique yields as a by-product the smallest eigenvalue of the operator in the finite dimensional space in which the problem is solved. Numerical results are presented only for the electrostatic case to illustrate the validity of this procedure which show excellent agreement with other available data. Author (GRA)

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-17957 British Broadcasting Corp., Kingswood (England).
THE EFFECT OF FABRIC COVERINGS ON THE ACOUSTIC PERFORMANCE OF MODULAR ABSORBERS
R. Walker and P. H. C. Legate Nov. 1981 12 p
(BBC-RD-1981/8) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

Acoustic treatment consisting of a standard size of module with different internal and front panel construction is widely used for the control of the acoustic environment of rooms such as studios, cubicles, and listening rooms. It is common practice to cover the treatment with a lightweight stretched fabric. The effects of this fabric covering on the acoustic performance of the treatment are considered. Some experimental measurements of these effects are presented. The fabric covering has no significant effect on the performance of acoustic treatment which absorbs most of the incident sound energy. However, at high frequencies some acoustic treatments are effective reflections of sound energy and, under these circumstances, the effects of the fabric covering can be significant. S.L.

N82-17958 Admiralty Marine Technology Establishment, Teddington (England).
ACOUSTIC INTENSITY VECTORS FROM AN INFINITE PLATE WITH LINE ATTACHMENTS
W. J. Spicer Oct. 1981 17 p refs
(AMTE(N)-TM-81086; BR80903) Copyright. Avail: Issuing Activity

Theoretically derived time averaged acoustic intensity vectors from an elastic plate with time harmonic forces, masses, masses and springs, grounded springs or displacement constraints are provided. Intensity plots of acoustic features caused by single line-force 250 Hz excitation show that radiation is very efficient. The intense near field shows areas where energy is being received by the plate. A fluid surface wave associated with the subsonic plate flexural wave is evident. A closed loop of energy circulation exists. At 2.5 kHz plate radiation efficiency increases. At 25 kHz (twice critical frequency) a leaky wave beam with low attenuation emanates from the plate surface. Author (ESA)

N82-17959# Naval Research Lab., Washington, D. C.
USRD TYPE F63 TRANSDUCER Interim Report
M. D. Jevnager and A. C. Tims Nov. 1981 12 p refs
(AD-A106748; NRL-MR-4585) Avail: NTIS HC A02/MF A01 CSCL 20/1

A small reversible audio frequency range transducer was developed. The type F63 transducer is designed to meet the specific needs of the user. It is sensitive and stable with temperature and moderate hydrostatic pressures as required by Naval Mine Engineering Facility to improve their mission capability. M.D.K.

N82-17960# Pennsylvania State Univ., University Park. Applied Research Lab.
THE REVERBERATION AND ABSORPTION CHARACTERISTICS OF A WATER-FILLED CHAMBER WITH AND WITHOUT A PRESSURE-RELEASE WALL LINING M.S. Thesis
K. Anthony Hoover 2 Jul. 1981 66 p refs
(Contract N00024-79-C-6043)
(AD-A107876; ARL/PSU/TM-81-150) Avail: NTIS HC A04/MF A01 CSCL 20/1

The requirements for a reverberation chamber in air have been described in the appropriate standards, but there is no mention that these same requirements cannot be applied to underwater reverberation chambers. A number of acoustic measurements were made to determine the reverberation time and absorption characteristics of an underwater chamber with and without a pressure-release wall covering. The reverberation times were found to be faster than the transient response times of conventional analog equipment. Therefore, a digital computer was employed to filter the data and to determine the slope, and thus, the reverberation time by using a linear, least-squares curve fit. The pressure-release wall covering was found to reduce the average sound absorption coefficients to values acceptable for a reverberation chamber based on the standards for air acoustics. Author (GRA)

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-17961 Utah Univ., Salt Lake City.
THE MASSES AND THE ELECTROMAGNETIC AND PION DECAY RATES OF PARTICLES CONTAINING ONE CHARMED OR BOTTOM QUARK Ph.D. Thesis
Dale Lee Izatt 1981 106 p
Avail: Univ. Microfilms Order No. 8127527

The masses of the S state hadrons containing only light quarks or containing a single charmed or bottom quark are calculated in a bag model using the static cavity approximation. The decay quarks are treated as point particles fixed at the center of the bag and the light quarks are treated in the usual way of being free particles confined to the bag. The MIT bag model has been extended to include center of mass corrections, asymptotic freedom, and Johnson's vacuum in applying the nonlinear boundary condition of minimizing the mass as a function of the radius, a rigorous first order approach is used that identifies and eliminates higher order terms in alpha sub s that normally appear in the expression for the mass when center of mass corrections are included. The electromagnetic and pion decay rates have also been calculated for those S state hadrons containing a single charmed or bottom quark. Dissert. Abstr.

N82-17962 Louisiana State Univ. and A&M Coll., Baton Rouge.
SCATTERING OF ELECTRONS BY HYDROGENIC IONS Ph.D. Thesis
Najib Nimer AbuSalbi 1981 265 p
Avail: Univ. Microfilms Order No. 8126944

The algebraic variational method in atomic physics is applied to the scattering (both elastic and inelastic) of electrons by highly stripped (hydrogenic) atomic ions. The overall behavior of the excitation 1s to 2s and 1s to 2p cross section is investigated using a 6 state expansion (1s-2s-2p one and two p pseudo-states) of the target wave function. The close coupling calculation is carried out up to a total angular momentum L sub max, (L sub max < or = 5) and for energies ranging from just above the n = 2 threshold to 6 times threshold; otherwise the Coulomb Born approximation with exchange is used. The computed collision strengths are then fit by an analytic formula. Finally, using a large pseudostate set, resonances between the n = 2 and n = 3 thresholds are investigated and accurately traced. Resonance enhancement of excitation rates is discussed. Results are reported for electron scattering by C(5+) and O(7+). Comparison is made to other theoretical calculations. Dissert. Abstr.

N82-17963 Connecticut Univ., Storrs.
CANONICAL QUANTIZATION OF NON-ABELIAN GAUGE THEORIES Ph.D. Thesis
Ralph Gregg Brickner 1981 158 p
Avail: Univ. Microfilms Order No. 8125449

Non-Abelian gauge theory in a manifestly covariant gauge is formulated as a theory of canonical field operators and embedded in an indefinite metric space. A gauge fixing field is included and every field component has a non-vanishing adjoint momentum with which it has canonical commutation (or anticommutation) relations. Faddeev-Popov fields are represented as scalar fermion fields with ghost particle excitations. A discussion is given of the relation between the existence of a subsidiary condition and the existence of pure gauge states that dynamically detach from observable states. Feynman rules are derived from the canonical formulation. Unitarity and the existence of unphysical degrees of freedom is discussed. The mechanism responsible for the fact that S matrix elements to pure gauge states vanish in non-Abelian gauge theories is examined in detail. The pure gauge states include single particle gluon and Faddeev-Popov ghosts, and two particle combinations of gluon and Faddeev-Popov ghosts. Dissert. Abstr.

N82-17964 Pennsylvania Univ., Philadelphia.
A DENSITY FUNCTIONAL APPROACH TO MANY-BODY EFFECTS IN THE OPTICAL RESPONSE OF ATOMS Ph.D. Thesis
Andrew Zangwill 1981 234 p
Avail: Univ. Microfilms Order No. 8127098

A method for calculating the optical response of finite electronic system which is accurate, computationally simple and lends itself to a ready physical interpretation of the results is presented. A time dependent local density approximation (TDLDA) represents a natural generalization of the usual local density approximation to the ground state properties of a many electron system. Using standard first order time dependent perturbation theory, a self consistent mean field theory for an effective field is derived which replaces the external field in the dipole matrix elements of the Golden Rule for photoabsorption. For photoabsorption from the rare gases and barium, i.e., closed shell atoms. It is shown that the TDLDA has the effect of redistributing the spectral oscillator strength to higher energies in such a way so that quantitative agreement is found with experiments performed using synchrotron radiation. The TDLDA is found to be more accurate than the traditional Hartree-Fock based random phase approximation with exchange. Dissert. Abstr.

N82-17965 Washington Univ., Seattle.
QCD AND WEAK ASYMMETRIES IN LEPTON PAIR PRODUCTION Ph.D. Thesis
David James Edward Callaway 1981 165 p
Avail: Univ. Microfilms Order No. 8126086

The interference of electromagnetic and weak production mechanisms for lepton pair production violate parity and charge symmetry are discussed. These effects are generally of the order of 1 percent for dilepton masses of 10 GeV. Measurements of these asymmetries in collisions of pions with polarized protons may lead to a greatly enhanced understanding of the polarization distributions of quarks in a polarized proton. The polarization structure of the d quark is shown to be of special interest. The asymmetries are computed within the framework of the parton model. The major focus is on the asymmetries calculated with the inclusion of first order perturbative QCD effects. A parity-violating asymmetry which may occur in collisions of unpolarized hadrons is also discussed. Dissert. Abstr.

N82-17966 Louisiana State Univ. and A&M Coll., Baton Rouge.
ACOUSTIC DETECTION OF HIGH ENERGY PARTICLES Ph.D. Thesis
Stanley Dean Hunter 1981 110 p
Avail: Univ. Microfilms Order No. 8126961

The acoustic signals generated by charged particles traversing a medium offer a new technique for particle detection. Rapid thermal expansion of the medium produces an impulsive signal with a shape similar to one cycle of a sine wave. In the case of charged particles, the energy deposition results from thermalization of the particles ionization energy loss in the medium. A thermodynamic model which derives an acoutic potential for the signal produced by a given energy deposition is presented. The relationship between the acoustic potential and the signal period and amplitude is illustrated. Three nonthermal mechanisms, microbubble production, molecular dissociation and electrostriction, are discussed. The acoustic potential and pulse shapes for these mechanisms are also shown. Dissert. Abstr.

N82-17967 Yale Univ., New Haven, Conn.
HEAVY HIGGS BOSONS AND THEIR LOW ENERGY IMPACT Ph.D. Thesis
Anthony Carmine Longhitano 1981 117 p
Avail: Univ. Microfilms Order No. 8125687

Spontaneously broken gauge theories have been rather successfully in describing the electroweak interactions of elementary particles, but one of the least understood aspects of these theories is the dynamical role of the elementary scalar fields. Although they are required in order to trigger spontaneous symmetry breakdown and, thereby, generate masses for the vector bosons and fermions, their presence in the Lagrangian as fundamental degrees of freedom leads to undersirable consequences: the values of certain coupling constants must be adjusted to very high accuracy and the quadratic mass divergences which accompany the scalars force the physical mass scale to be unstable against small variations of the fundamental parameters of the theory. A solution to these problems is provided by a mass generation mechanism in which the scalars are bound states of a new species of strongly interacting fermions.
Dissert. Abstr.

N82-17968 State Univ. of New York at Stony Brook.
VERTICAL COHERENT INSTABILITIES IN BUNCHED PARTICLE BEAMS Ph.D. Thesis
Ronald Don Ruth 1981 96 p
Avail: Univ. Microfilms Order No. 8126240

The vertical coherent instabilities which occur in bunched particle beams were studied. The velocity of a single particle in a bunch is not constant, but rather consists of an equilibrium velocity and an oscillation about that. The single particle equations of motion and the Vlasov equation to obtain an integral equation which governs the coherent motion of a single bunch of particles are used. The solutions to the integral equation are then examined in two different regions. For the case of a bunch long compared to the characteristic wavelength of the instability, two regions of instability were found. The first is a region of slow blowup at low currents (growth rate less than the synchrotron frequency). The second is a region of fast blowup (growth rate much greater than the synchrotron frequency). For the case of a bunch shorter than the characteristic wavelength of the instability the behavior is quite different. Dissert. Abstr.

N82-17969 Columbia Univ., New York.
TWO-DIMENSIONAL INTERACTION OF ION-ACOUSTIC SOLITONS Ph.D. Thesis
Patrick Aubrey Folkes 1981 121 p
Avail: Univ. Microfilms Order No. 8125285

The two dimensional nonlinear interaction of two planar ion

acoustic solitons were studied experimentally. When the angle between the wave vectors of the two interacting solitons is small and the solution amplitudes approach a critical value, a resonant nonlinear interaction occurs resulting in the formation of a new soliton. The measured spatial structure of the density perturbation near resonance and experimental measurements of the phase shift and the amplitude enhancement ratio show reasonably good agreement with theory. When two solitons interact at large angles, only a linear superposition of the two solitons is observed with no evidence of a phase shift not the formation of a new soliton. Contrary to theoretical results for small angles and soliton amplitudes larger than the critical value, no singular solitons were observed. Dissert. Abstr.

N82-17970 Florida Univ., Gainesville.
ENERGY TRANSFER IN MOLECULAR COLLISIONS Ph.D. Thesis
Eduardo Fermin Vilallonga 1981 162 p
Avail: Univ. Microfilms Order No. 8127473

Vibrational and rotational energy transfer in hyperthermal molecular collisions are investigated by means of time correlation function methods. Within this approach, the collisional differential cross section is expressed as the Fourier transform of the time correlation function of the transition operator, which evolves in time in accordance with the internal motions of the noninteracting molecules. The approach used allows the systematic introduction of approximations to the transition operator, which are based on models of the intermolecular forces and of the collision dynamics, the resulting correlation functions are readily evaluated for most polyatomics without need of internal state or partial wave expansions. The multicenter representation of the intermolecular potential is investigated, and multicenter surfaces are developed for ther interaction of Li(+) with CO and with CO2. Combining these developments, differential cross sections for the vibrational and rotational excitation of N2, CO and CO2 in collisions with hyperthermal Li(+) ions are calculated. Dissert. Abstr.

N82-17971 Illinois Univ. at Urbana-Champaign.
NUCLEAR MATTER WITH REALISTIC HAMILTONIANS Ph.D. Thesis
Isaac Lagaris 1981 159 p
Avail: Univ. Microfilms Order No. 8127625

Determination of the nuclear Hamiltonian is a prerequisite for development of a microscopic theory to explain the structure and the properties of observed nuclei and neutron stars. It may contain terms associated with two, three or many particle interactions. Some theoretical methods designed to handle the nuclear matter many body problem are reviewed. A realistic V sub 14 model of two nuclear interaction was obtained by fitting the available two body data in S, P, D and F waves. The variational theory was extended to treat this realistic interaction model and nuclear matter properties were calculated with it neglecting many nucleon interactions. A form for a three nucleon interaction (TNI), inspired from the meson theory of nuclear interactions is postulated. The effect of TNI on the energy of nuclear matter is described with three parameters to obtain the empirical energy, density and compressibility of nuclear matter. The effective nuclear hamiltonian obtained in this work may be used to study the equation of state of hot and cold nucleon matter, the structure of neutron stars, and the volume part of the nucleon nucleus optical potential. Dissert. Abstr.

N82-17972 North Carolina Univ. at Chapel Hill.
NUCLEAR MAGNETIC RESONANCE STUDIES OF TRANSITION METAL COMPLEXES Ph.D. Thesis
Michael Andrew Freeman 1981 200 p
Avail: Univ. Microfilms Order No. 8125577

Aminopolycarboxylate ligands with three facially arranged dentates form stable oxomolybdenum complexes in solution. At pH6, ligands containing amine and carboxylate dentates form complexes containing the MoO3 cis moiety. Ligands with a hydroxyl dentate form dimeric complexes with a Mo2O5(2+) oxobridged core. The hydroxyl proton is lost in the reaction. The transinfluence of coordinated alkoxyl dentates determines the site of the oxobridge. A correlation of transinfluence with other oxobridged forms is seen. A qualitative measure of the transinfluence of ligands is obtained from crystal structure data and these are correlated to proton affinities of model compounds. Oxygen 17 NMR chemical shifts of MoO3L complexes are far more sensitive to transinflurences than crystal structure bond distance measurements. The O-17 shifts of oxomolybdenum complexes and oxoanions reveal a smooth, nonlinear relation between chemical shift and MoO bond length. Dissert. Abstr.

N82-17973 Missouri Univ. -Rolla.
NEUTRON ACTIVATION ANALYSIS OF NUCLIDES FROM STELLAR AND MAN-INDUCED NUCLEAR REACTIONS Ph.D. Thesis
Lawrence Lee Oliver 1981 109 p
Avail: Univ. Microfilms Order No. 8123584

Neutron activation and gamma counting were used to determine the relative abundances of six stable tellurium isotopes in the acid-etched residues of the Allende meteorite. The results were correlated with the isotopic compositions of xenon and the elemental abundances of helium and neon in similarly prepared residues. Nucleosynthesis appears to be the only viable explanation or the anomalous isotopic and elemental compositions observed in these residues. Results suggest that the solar system condensed from an isotopically and chemically zoned nebula that was produced by the explosion of a supernova, concentric with the present Sun. A combination of neutron activation and mass spectrometry was used to determine the concentrations of fissiogenic iodine 129 and stable iodine 127 in rain, milk and the thyroids of man, cow and deer from Missouri. Rain and deer thyroids show the highest average values of the iodine 129/iodine 127 ratio. Milk and the thyroids of cattle and humans show successively lower values of the iodine 129/iodine 127 ratio due to dietary additives of mineral iodine and to biological averaging. Dissert. Abstr.

N82-17974 Arkansas Univ., Fayetteville.
RECENT INJECTIONS OF NUCLEAR DEBRIS IN THE ATMOSPHERE Ph.D. Thesis
Stanley Warren Stevens 1981 139 p
Avail: Univ. Microfilms Order No. 8127266

The Sr-89/Sr-90 and Ba-140/Sr-90 ratio variation in rain and snow samples were studied. The presence of fresh nuclear debris was detected following the Chinese tests. A tropospheric cycling effect was clearly indicated in the radiostrontium and radiobarium data. The stratospheric residence time for Sr-90 was calculated to be 1.00 yr (stratospheric residence half-time = 0.71 yr). The mean tropospheric residence times were compared to the mean residence times determined from long-lived radon daughters following each of the Chinese tests. Results from the measurements of Sr-89/Sr-90 ratios in rain indicate that the mean residence time of the fallout particles in the lower stratosphere is 200 + or - 100 days. Nuclear debris injected into the atmosphere by the Three-Mile-Island accident was not detected in rain samples. Dissert. Abstr.

N82-17975 Florida State Univ., Tallahassee.
LONG RANGE INTERMOLECULAR POTENTIALS FROM STATIC FORM FACTORS Ph.D. Thesis
Ker-Fong Lee 1981 117 p
Avail: Univ. Microfilms Order No. 8125776

An expression is derived for the charge density susceptibility which under the Unsold approximations, reduces to the Fourier transforms of electron density functions. When considering uncorrelated wavefunctions, the susceptibility is given simply by static form factors in terms of which the second order Coulomb energy may be calculated. This is equivalent to applying the Unsold approximations directly unto the second order Coulomb energy expression in the usual time independent Rayleigh-Schrodinger perturbation theory. Using the interactions of hydrogen-hydrogen and helium-helium diatoms as test cases, the various integrals for their second order dispersion energies were evaluated numerically and analytically. The two approaches differ in that while the latter requires analytic form factors, the former can use both analytic as well as the readily available tabulated form factors. Their results are found to be in excellent agreements. Dissert. Abstr.

N82-17976# Fom-Instituut voor Plasmafysica, Jutphaas (Netherlands).
SPACE AND TIME RESOLVED MEASUREMENTS OF ION ENERGY DISTRIBUTIONS BY NEUTRAL BEAM INJECTION

IN TORTUR 2
H. J. B. M. Brocken Oct. 1951 36 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-81-137) Avail: NTIS HC A03/MF A01

The method is used in the TORTUR 2 Tokamak to study the space and time evolution of the ion temperature profile of the plasma. The method fails when multiple charge exchanges occur between the beam region and the plasma edge. Measurements are disturbed by attenuation of the flux of charge exchange neutrals originating from the beam and by neutrals lost from the beam becoming part of the neutral gas background, thereby enhancing the flux of charge exchange neutrals originating from the remainder of the plasma. Beam modulation, phase sensitive detection, and good access overcome these effects.
Author (ESA)

N82-17977# California Univ., San Diego.
MOLECULAR BEAM STUDIES OF LOW ENERGY REACTIONS Annual Summary Report
R. H. Neynaber and S. Y. Tang 20 Nov. 1981 8 p refs
(Contract N00014-81-K-0255; NR Proj. 393-004)
(AD-A108099) Avail: NTIS HC A02/MF A01 CSCL 20/7

The report describes merging-beams studies of charge-transfer reactions. Included are investigations of the Cl(+)-Xe and He(+)-He(23S) systems.
GRA

N82-17978# Singer Co., Little Falls, N. J.
RELAXATION PHENOMENA IN OPTICALLY PUMPED MERCURY ISOTOPES Final Scientific Report, 1 Jul. 1976 - 30 Jun. 1981
J. H. Simpson, P. A. Heimann, M. J. Kelly, and D. I. Shernoff 31 Aug. 1981 104 p refs
(Contract F49260-76-C-0009; AF Proj. 2301)
(AD-A107604; KD-81-15; AFOSR-81-0724TR) Avail: NTIS HC A06/MF A01 CSCL 20/8

Relaxation measurements of optically pumped 199 Hg and 201 Hg in nuclear magnetic resonance (NMR) cells have shown that the activation energy for adsorption of ground state mercury atoms ranged from .22 eV to .24 eV for a variety of materials. These measurements also provided a means of determining the temperature dependence of the product of concentration and strength of paramagnetic centers on the inner cell surfaces. The origins and effects of both randomly-fluctuating and steady-state quadrupole perturbations on 201 Hg have been clarified. A calculation predicts that the relaxation rate of 201 Hg in a cube-shaped cell should be independent of cell orientation. This prediction was verified experimentally. Another calculation, which modelled 201 Hg as a single four-level spin system, predicted a functional form for the non-exponential decay of 201 Hg in the presence of a quadrupole perturbation. These predictions were also verified experimentally. Techniques have been developed for producing mercury NMR cells with long relaxation times and stable characteristics.
Author (GRA)

N82-17979# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
VERTICAL COHERENT INSTABILITIES IN BUNCHED PARTICLE BEAMS Ph.D. Thesis
R. D. Ruth Jul. 1981 94 p refs
(Contract DE-AC02-76CH-00016)
(DE82-003246; BNL-51425) Avail: NTIS HC A05/MF A01

The velocity of a single particle in a bunch is not constant, but rather consists of an equilibrium velocity and an oscillation about that. This synchrotron oscillation occurs at a frequency which is in general much less than the other characteristic frequencies of the system: the revolution frequency and the transverse betatron frequencies. The approach illuminates the effect of the synchrotron frequency in setting the time scale for an instability, without making restrictive assumptions on the relative size of the synchrotron frequency and the coherent frequency shift (on growth rate).
DOE

N82-17980# Washington Univ., Seattle.
ORBITING EFFECTS IN THE INELASTIC SCATTERING OF PROTONS TO THE CONTINUUM
H. C. Bhang, I. Halpern, and T. A. Trainor 1981 12 p refs
(Contract DE-AC06-76ER-01388)
(DE82-002287; DOE/ER-01388/508) Avail: NTIS HC A02/MF A01

The persistent positive analyzing powers in the backward hemisphere for moderate energy (p Vector,p') reactions to the continuum are found to be reproduced by one-step DWBA calculations. An analysis of these calculations shows that the effect arises from protons incident on one side of the nucleus and leaving on the other.
DOE

N82-17981# New York Univ., N. Y. Inst. of Mathematical Sciences.
COMPUTATIONAL METHODS FOR THE NUCLEAR- AND NEUTRON-MATTER PROBLEMS Progress Report
M. H. Kalos 1981 9 p refs
(Contract DE-AC02-79ER-10353)
(DE82-001584; DOE/ER-10353/3) Avail: NTIS HC A02/MF A01

The development of Monte Carlo methods for the treatment of extensive nuclear and neutron matter is reported. Treatment of finite nuclei is also discussed.
DOE

N82-17982# Oxford Univ. (England). Nuclear Physics Lab.
THE LASER ACCELERATOR-ANOTHER UNICORN IN THE GARDEN
L. N. Hand Jul. 1981 21 p refs Sponsored in part by the Guggenheim Foundation and the Science Research Council
(PB82-115197; Rept-62/81) Avail: NTIS HC A02/MF A01 CSCL 20G

Some proposed techniques for using laser beams to accelerate charged particles was reviewed. Two specific ideas for grating type accelerating structures are discussed. Speculations are presented about how a successful laser accelerator could be used in a multipass collider; a type of machine which would have caharacteristics intermediate between those of synchrontrons and linear (single pass) colliders. No definite conclusions about practical structures for laser accelerators are reached, but it is suggested that a serious effort be made to design a small prototype machine. Achieving a reasonable luminosity demands that the accelerator either be a cw machine or that laser peak power requirements to be much higher than those presently available. Use of superconducting gratings requires a wavelength in the sub-millimeter range.
GRA

N82-17983# Oxford Univ. (England). Nuclear Physics Lab.
A MODEL FOR HADRONIC INCLUSIVE CROSS-SECTIONS
J. Wells Aug. 1981 26 p refs
(PB82-115205; Rept-70/81) Avail: NTIS HC A03/MF A01 CSCL 20H

A model based on the simple quark model is proposed which describes the inclusive cross-sections for hadronic interactions. This model gives separate predictions for the 'beam residue', 'target residue' and central components of the inclusive cross-sections. A method of extracting these components from experimental data is described; separated components are compared with the predictions.
GRA

N82-17984# Oxford Univ. (England). Nuclear Physics Lab.
LOW-ENERGY BEHAVIOUR OF THE REAL DEPTH OF THE PROTON OPTICAL POTENTIAL
B. Gyarmati, R. G. Lovas, T. Vertse, and P. E. Hodgson 1980 11 p refs
(PB82-115213; Rept-71/81) Avail: NTIS HC A02/MF A01 CSCL 20H

The coupling of the elastic channel to the inelastic ones reached through strongly excited collective levels are examined. The coupling effects the real pair of the optical potential around the Coulomb barrier considerably.
T.M.

N82-17985 Washington Univ., Seattle.
A SPACE-TIME STUDY OF DOUBLE SCATTERING IN HADRON DEUTERON COLLISIONS Ph.D. Thesis
Eric Osbourne Rogers 1981 374 p
Avail: Univ. Microfilms Order No. 8126138

A space-time picture of double scattering in the deuteron (those events where both the neutron and proton interact with the incoming hadron), is developed. Work is done in the deuteron rest frame using the assumption that processes involving large

virtual masses are damped. For the general case, the process is shown to consist of sequential scatterings, while for large momenta, due to Lorentz contraction, separation between neutron and proton may be neglected and the Abramovskii, Gribov, Kancheli cutting rules derived. The process is modeled with the Mandelstam diagram and verifies previous results by explicit calculation. A numerical estimate is then made of the size of the effect and a comparison with experimental data is made.
Dissert. Abstr.

N82-17986 Arkansas Univ., Fayetteville.
APPLICATION OF EIKONAL APPROXIMATION TO CHARGE TRANSFER IN ENERGETIC ION-ATOM COLLISIONS Ph.D. Thesis
Tak-San Ho 1981 92 p
Avail: Univ. Microfilms Order No. 8127211

The eikonal approach is applied to the evaluation of the cross section for electron capture from an arbitrary nlm shell of a hydrogenic target atom into an arbitrary n'l'm' shell of a fast hydrogenic projectile. Both the impact and wave pictures are employed and their equivalance is discussed. The results are obtained in exact analytical closed form. The approach is also extended here to allow for multi-electron targets, where, as a first approximation, each atomic orbital is specified by three hydrogenic quantum numbers, an effective nuclear charge Z sub T, and an energy eigenvalue in the impact picture, or ionization potential in the wave picture. Because of incomplete information on the many-body target, the Z sub T prime appearing in the eikonal phase factor is left undetermined; nonetheless, analytic expressions are derived for the theoretical cross sections, and numerical values calculated for simple choices of Z sub T prime. Present calculations are compared with the OBK results and the existing experimental data for the capture from H and from the multielectron targets C, Ne, Ar, N2, O2, and He.
Dissert. Abstr.

N82-17987 Arizona Univ., Tucson.
BEAM-FOIL STUDIES OF ATOMIC MEAN-LIVES IN THE VACUUM ULTRAVIOLET Ph.D. Thesis
Peter Walden Rathmann 1981 130 p
Avail: Univ. Microfilms Order No. 8126181

The beam-foil method was used to determine mean-lives of excited atomic states. Initial studies were done on states of the helium-and hydrogen-like ions B(IV) and B(V), with the mean-lives determined by fitting the decay curves to sums of exponential terms. Since theoretical values of the mean-lives are very precise in these simple atomic systems, the accuracy of the experimental method is indicated. A series of measurements was made of the low lying 2s 2p states in nitrogen-like Ne(IV), Na(V) Mg(VI), A(VII), and Si(VII). The experimental results were compared to theoretical calculations and showed excellent agreement with nonclosed-shell many electron theory. The lifetimes of the 4P 2p1/2 and 4P 2p3/2 states in copper-like Br (VII) were determined by measuring decay curves for both the primary and cascade decays and then analyzing the curves jointly.
Dissert. Abstr.

N82-17988 Carnegie-Mellon Univ., Pittsburgh, Pa.
A QUARK MODEL OF THE NONSTRANGE BARYONS Ph.D. Thesis
Charles Patterson Forsyth 1981 142 p
Avail: Univ. Microfilms Order No. 8127350

The masses, elastic widths and photoproduction amplitudes of the S=0 resonance with masses less than 2.5 GeV were fit using a quark model with hyperfine interactions. Included in the analysis are all of the states of N=0, 1, 2, and 3 bands. In addition, predictions for the resonance decays to all ground state baryons and mesons were provided. Three models for the decays of these states were examined. It was concluded that the usual spectator model for the decays must be modified. In order to fit the photoproduction data, a third term was added to the minimal electromagnetic Hamiltonian. No positive evidence was found for a tensor force, while conflicting evidence was found for a three body split orbit force. A significant contact force is needed but its strength seems to vary from band to band. Finally, it is concluded that the (56,1-) multiplet is primarily a three quark state, although its mass is lower than expected. Dissert. Abstr.

N82-17989 Clemson Univ., S.C.
A THEORETICAL STUDY OF THREE-BODY CORRELATIONS IN ATOMIC FLUIDS Ph.D. Thesis
Robert Neal Sane 1981 51 p
Avail: Univ. Microfilms Order No. 8126927

A theoretical study of triplet correlations in simple classical fluids was made from two distinct approaches. In one approach the first order terms in the h-bond expansion for triplet correlations as given by Abe is accurately evaluated numerically for the Lennard-Jones fluid. Results are obtained for a range of fluid densities and comparisons are made to the accurate data obtained through Monte Carlo computer simulations. These comparisons indicate that the first order term is inadequate near and beyond the triplet point of the system. In the other approach the description of triplet correlations is discussed in terms of fitting computer generated data to a truncated expansion in orthonormal functions. A novel set of functions that are othonormal over a finite triangular domain is introduced. The expansion method is illustrated with an application to the rigid sphere model. This second approach could lead to the best method of describing triplet correlations in simple fluids. Dissert. Abstr.

N82-17990 Colorado State Univ., Fort Collins.
PHOTODISSOCIATION OF METAL-HALIDES: LASERS, ABSORPTION LINESHAPE, AND POLARIZATION OF FLUORESCENCE STUDIES Ph.D. Thesis
Hamid Hemmati 1981 188 p
Avail: Univ. Microfilms Order No. 8126433

An anisotopic velocity distribution of the photoproducts which is observed through the Doppler lineshape of atomic emission, and, a polarization of the emission from the excited photoproducts were observed in atomic T1 photofragments: Five new atomic lasers were obtained in the neutral spectrum of Ga, Pb, Ge, Sn, and Sb on pulsed basis following photodissociation of the corresponding metal halide parent molecules by a 193 nm ArF laser. One of the Ga laser transition terminates on the ground state, while the other laser transitions terminate on the lowest metastable state of the atoms. The atomic fragments are shown to have been produced following multiphoton dissociation of the parent molecule. The degree of polarization of atomic T1, Hg, Pb, and Na photofragments was measured to determine whether a particular magnetic sublevel of the atomic products is populated preferentially following photodissociation of the parent molecules. The degree of polarization of T1 emission at 535 nm was measured to be -0.043 + or - 0.003. Dissert. Abstr.

N82-17991 Carnegie-Mellon Univ., Pittsburgh, Pa.
ELASTIC AND INELASTIC SCATTERING OF 800 MeV/c K+/- MESONS FROM CARBON-12 AND CALCIUM-40 Ph.D. Thesis
Daniel Robert Marlow 1981 445 p
Avail: Univ. Microfilms Order No. 8127354

The four elastic scattering reactions C-12 (K+/-,K+/-) and Ca-40 (K+/-,K+/-), and the four inelastic scattering reactions, C-12 (K+/-,K+/-) to the J(p) = 2+ 4.43 MeV and J(p) = 3-states were studied using the hyper-nuclear spectrometer and the low energy separated beam at the alternating gradient synchrotron. The agreement between the experimental data and the theoretical predictions is reasonable over the angular range of the data, with the exception of Glauber calculations of the K+ elastic scattering. In those cases, the eikonal approximation proves to be a poor approximation. Smaller discrepancies are found in some other cases, indicating the possible need for more sophisticated calculations. Reasonable agreement with the inelastic data is realized only with single impulse calculations, leading to the conclusion that the collective model descriptions of the transition densities are not adequate. The K+ scattering results show particular sensitivity to the details of the transition densities. Dissert. Abstr.

N82-17992 Arkansas Univ., Fayetteville.
NEUTRON SPECTRA PRODUCED BY A FAST PULSE ASSEMBLY IN FREE FIELD AND PERTURBED ENVIRONMENTS Ph.D. Thesis
Thomas Michael Flanders 1980 153 p
Avail: Univ. Microfilms Order No. 8127253

The free field radiation environment produced by the White Sands Missile Range Fast Burst Reactor (FBR) was calculated.

The primary ranges of interest were for positions 7 meters and 170 meters from the FBR. Calculations were also made for penetrations at ranges of 600 meters and 1000 meters. Neutron spectral shapes were also calculated for a perturbed environment produced by iron and iron + aluminum shielding materials. The radiation transport calculations were performed using the ANISN and DOT 3 discrete ordinates codes. Both codes provide solutions to the Boltzmann transport equation by the discrete ordinates method. The DOT 3 two dimensional code required the use of the GRTUNCL auxiliary code to provide a first-collision source. The use of a first-collision source minimizes the ray effect which is associated with 2 dimensional geometry. The calculated spectral shapes, integral fluences, and neutron dose agree well with experimental determinations of the FBR in a free field environment. Dissert. Abstr.

N82-17993 Houston Univ., Tex.
PROBABILISTIC TREATMENT OF RELATIVISTIC SCATTERING OF SCALAR PARTICLES AND THEIR MASS SPECTRUM Ph.D. Thesis
Vigen Ohanian 1980 110 p
Avail: Univ. Microfilms Order No. 8126941

Stuckelberg's manifestly covariant wave equation describing relativistic spin zero particles, the four space formalism (FSF), is assessed through specific physical applications. A machinery for performing scattering calculations were developed. The solutions incorporate the Stuckelberg-Feynman interpretation for particle antiparticle pairs. The probability interpretation for relativistic scattering of scalar particles results. Application to low order Coulomb scattering of Pi(+) mesons is discussed in detail. Calculational and conceptual experiencies of this approach was emphasized. The PSF approach may be used to directly investigate problems involving particles of finite width in an interacting medium. Via the mass representation of the FSF, exact solutions for the mass spectrum of scalar particles in a static uniform electric field perpendicular to a static uniform magnetic field is discussed. Advantages of the FSF operator language, such as the hermiticity in the usual sense of the evolution operator, is emphasized. Dissert. Abstr.

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-17994# Imperial Coll. of Science and Technology, London (England). Heat Transfer Section.
MATHEMATICAL MODELS IN NUCLEAR-REACTOR THERMAL HYDRAULICS
D. Brain Spalding Mar. 1980 62 p refs Presented at Am. Nucl. Soc. Meeting on Nucl.-Reactor Thermal Hydraulics, Saratoga, N.Y., 6 Oct. 1980
(HTS/81/3) Avail: NTIS HC A04/MF A01

The mathematical problem of predicting the flow of interspersed phases, possessing differing (average) velocities at the same instant and location, and of successful methods of solving the problem are reviewed. It is argued that the mathematical difficulties having now been overcome, further attention should be devoted, on the computational side, to faster algorithms and more flexible computer codes; and, on the physical side, to the development of models for interfacial area, interphase transport, and interactions with solid structural elements. J.M.S.

74 OPTICS

Includes light phenomena.

N82-17995 Columbia Univ., New York.
PHOTON ECHO MODULATION IN LaF3:Pr3+ Ph.D. Thesis
Kophu Chiang 1981 120 p
Avail: Univ. Microfilms Order No. 8125263

The photon echo modulation technique was utilized to measure the hyperfine structure and relaxation characteristics of the terminal levels of the 3H4 (3P0(477.7 nm) transition in Praseodymium doped Lanthanum trifluoride (LaF3:P4(3+)). Using two home made nitrogen laser pumped dye lasers modulated photon echoes were observed over a 8 micro sec range of pulse separations. In this range the echoes decay in a simple exponential manner by a factor of 10 to the 5th power and yield a homogeneous linewidth of 70 Khz (FWHM) for a 0.03% LaF3:P(3+) sample. Experiments performed with a less concentrated sample (0.01%) show that the homogeneous linewidth is even narrower, and is about 40 Khz (FWHM). By Fourier transforming the echo modulation data it was possible to determine the hyperfine energy level splittings and their associated linewidths in both the ground (3)H4 and excited (3)P0 states. Dissert. Abstr.

N82-17996 Illinois Univ. at Urbana-Champaign.
EXPERIMENTAL CORRELATION AND SELF CONSISTENT ANALYSIS OF AN IR, FIR, MW TRIPLE RESONANT SYSTEM IN AMMONIA Ph.D. Thesis
William Wei-Long Lee 1981 120 p
Avail: Univ. Microfilms Order No. 8127630

In a triple resonant system of NH3, the interactions between the IR, FIR, and MW were studied by means of density matrix. The FIR and MW frequencies calculated from the self consistent analysis were verified by the experiments. The density matrix equations for the triple resonance were solved in matrix form which provided an inexpensive way for the calculations. The gain curves for the FIR and MW were plotted from the results of the calculations in which the M-degeneracy was included. The curves displayed the linear, Raman, and Hyper-Raman processes between the IR, FIR, and MW. For the Raman process, the IR threshold intensity (10 kW/sq cm) and saturation intensity (500 kW/sq cm) were identified which implied the use of a CO2TEA laser in the experiment. The calculated Raman gain and Hyper-Raman gain as functions of pressures have provided a reasonable interpretation of the measured optimal pressure (3.3 torr) and maximum pressure (10 torr). The self consistent analysis for the FIR and MW frequencies was conducted via a series of calculations for their gain curves. Dissert. Abstr.

N82-17997 Michigan Univ., Ann Arbor.
OPTICAL PROPAGATION THROUGH HORIZONTALLY STRATIFIED, QUASI-SINUSOIDAL, PHASE GRATINGS Ph.D. Thesis
Kim Allen Winick 1981 225 p
Avail: Univ. Microfilms Order No. 8125222

A general theory was developed for determining the reflection and transmission coefficients of holographically produced, horizontally stratified, quasi-sinusoidal, phase gratings as a function of incident angle, wavelength and polarization. Theorems are stated and proved about polarization effects and about the relationship between the spectral and angular characteristics of such gratings. Strong similarities are shown to exist between these gratings and conventional multilayer dielectric stacks. The inverse scattering problem is considered. It is shown that horizontally stratified phase gratings can be used as position-invariant, frequency domain filters in coherent optical systems. An interferometric technique is developed for fabricating horizontally stratified, quasi-sinusoidal, phase gratings. Some simple reflection gratings are fabricated in dichromated gelatin, and their properties are reported. Dissert. Abstr.

N82-17998*# Honeywell Electro-Optics Center, Lexington, Mass.
MODERATE TEMPERATURE DETECTOR DEVELOPMENT Final Technical Report, Sep. 1979 - May 1980
J. W. Marciniec, R. J. Briggs, and A. K. Sood Dec. 1981 45 p refs
(Contract NAS9-15250)
(NASA-CR-167504; HONEYWELL-8103-26) Avail: NTIS HC A03/MF A01 CSCL 20F

P-side backside reflecting constant, photodiode characterization, and photodiode diffusion and G-R currents were investigated in an effort to develop an 8 m to 12 m infrared quantum detector using mercury cadmium telluride. Anodization, phosphorus implantation, and the graded band gap concept were

approaches considered for backside formation. Variable thickness diodes were fabricated with a back surface anodic oxide to investigate the effect of this surface preparation on the diffusion limited zero bias impedance. A modeling technique was refined to thoroughly model diode characteristics. Values for the surface recombination velocity in the depletion region were obtained. These values were improved by implementing better surface damage removal techniques. A.R.H.

N82-17999# Drexel Univ., Philadelphia, Pa. Dept. of Physics and Atmospheric Sciences.
AN INVESTIGATION OF VARIABLE COHERENCE SOURCES AND OF SOME PRACTICAL APPLICATIONS Final Report
Lorenzo M. Narducci and James D. Farina 9 Nov. 1981 31 p refs
(Contract DAAG29-80-K-0001)
(AD-A107715; ARO-17514.1-P) Avail: NTIS HC A03/MF A01 CSCL 20/6

We have investigated, designed and tested a modified form of Mach-Zehnder interferometer for measuring the coherence length of a partially coherent source. The instrument is unique that it allows the recording of a fringe pattern and the extraction of the corresponding visibility curve even for sources with poor spatial coherence by virtue of the instrument's differential magnification. To our knowledge, the idea of magnifying a coherence pattern is new and could have important laboratory applications. Author (GRA)

N82-18000# Defence Research Establishment Valcartier (Quebec). Research and Development Branch.
MULTIPLE TARGET TRACKING WITH AN AM RETICULE SEEKER
K. W. Morgan Sep. 1981 53 p In ENGLISH; FRENCH summary
(AD-A107854; DREV-R-4203/81) Avail: NTIS HC A04/MF A01 CSCL 17/5

A generic AM-reticle seeker was modelled, and its steady-state equilibrium position, in the presence of either two point targets or a point and an extended target, determined by digital computer simulation. Author (GRA)

N82-18001# European Office of Aerospace Research and Development, FPO New York 09510.
OPTICAL THIN FILM COATINGS
Armen E. Mardiguian and J. H. Fenner Jun. 1981 68 p
(AD-A107808; EOARD-TR-82-1) Avail: NTIS HC A04/MF A01 CSCL 11/3

Results of a survey on optical thin film and substrate technology conducted by the European Office of Aerospace Research and Development are reported. Over thirty university, commercial, and government laboratories were visited in ten Western European nations. Specific subject areas include design, synthesis, and characterization of optical thin films, substrate preparation and testing, and production of equipment for thin film deposition. Summary section indicating the most significant efforts and general state of optical coating research in Europe is included. Author (GRA)

N82-18002# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
BEAM BROADENING IN DENSE SCATTERING MEDIA
J. Langerholc 1981 22 p refs
(MBB-UA-583-81-O) Avail: NTIS HC A02/MF A01

The full 3D integral equation for the spherically symmetric scattering of light in a medium of densely packed uniformly distributed scattering centers is solved for the case of a cylindrically symmetric laser beam (Gaussian profile) directed normally at the slab. The intensity (irradiation) of the scattered light is calculated as a function of the r and z coordinates in the slab, and the distribution of the light scattered out of the slab is studied. After reduction to a two dimensional problem, the discretized integral equation is solved by a standard iteration procedure. The resulting two dimensional distribution is reconverted to 3D to obtain the r and z dependence of the irradiance. From the irradiance distribution the angular distribution of backward and forward scattered light is calculated; special emphasis is placed on the radial dependence of the scattered light emerging normal to the surface. Spot size is defined and calculated for various values of beam radius and material parameters nominally chosen to represent irradiation of translucent biological tissue by a Nd:YAG laser. Author

N82-18003# European Space Agency, Paris (France).
DEFINITION OF THE MAROTS REFLECTOR MERIDAN LINE BY INTERPOLATION: APPLICATION TO OPTICAL MEASUREMENTS
M. Bouthier Nov. 1981 21 p Transl. into ENGLISH of "Definition de la Meridienne du Reflecteur de Marots par Interpolation. Application aux mesures Optiques" rept. CNES-78/CT/PRT/SST/SM/105 Toulouse Original report in FRENCH previously announced as N81-30969
(ESA-TT-696; CNES-78/CT/PRT/SST/SM/105) Avail: NTIS HC A02/MF A01

The positioning of the optics, as part of laboratory tests on the MAROTS reflector in order to measure thermoelastic deflections while simulating typical orbital temperature distributions, is described. The experiment revolves around a theodolite located at the axis of the reflector; small mirrors are attached to the reflector. Consequently, positioning depends on the reflector surface being known with sufficient accuracy. As the meridian line is initially defined by 40 points, interpolation of measurement data provides accurate coordinates and slopes at any point. Interpolation by adequate spline functions is shown to give satisfactory results, making it possible to optimize the location of the theodolite and the mirrors for the deflection measurements. Author (ESA)

N82-18004# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
MEASUREMENT OF VISIBLE RADIATION TRANSFER IN WATER UNDER LABORATORY AND FIELD CONDITIONS Technical Report, 1 Oct. 1978 - 30 Sep. 1981
F. P. Incropera Sep. 1981 93 p refs Sponsored by Office of Water Research and Technology
(PB82-108481; PWRRC-TR-140; OWRT-A-058-IND(2)) Avail: NTIS HC A05/MF A01 CSCL 06C

Solar radiation transfer in a body of water strongly influences thermal conditions and the growth of photosynthetic organisms. The development of methods for accurately predicting this transfer is investigated. The optical properties of natural waters and the distribution of radiation of water samples under laboratory conditions were measured. The results were compared with predictions. The distribution of radiation under field conditions were also measured. A complete set of optical property measurements were obtained from samples of water from the Wabash River. GRA

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-18005 Princeton Univ., N. J.
STUDIES OF RUNAWAY ELECTRON TRANSPOT IN PLT AND PDX Ph.D. Thesis
Cris William Barnes 1981 190 p
Avail: Univ. Microfilms Order No. 8127747

The physical mechanisms responsible for anomalous electron heat transport were examined. The confinement time of the runaway electrons was measured by a variety of experiments on the Princeton Large Torus (PLT) and the Poloidal Divertor Experiment (PDX). Measurements made in different energy ranges show the confinement time being 2-6 msecs between 0.4-1.0 MeV (10-30 percent of the thermal confinement time), and increasing to 50-100 msecs or greater between 8-22 MeV. The confinement time increases with bulk plasma density, and with toroidal field at low densities. Experiments include determination of the electron spectrum from the amount of photonuclear activation of a stainless steel limiter, and of the runaway electron scrape-off thickness measured from the angular distribution of that activation. The ratio of electrodisintegration to photon-neutron production, and the time dependence of those emissions, are related to transport coefficients. Dissert. Abstr.

N82-18006 Princeton Univ., N. J.
FUNCTIONAL INTEGRAL APPROACH TO CLASSICAL STATISTICAL DYNAMICS Ph.D. Thesis
Roderick Von Jensen 1981 129 p
Avail: Univ. Microfilms Order No. 8127749

The functional integral method for the statistical solution of stochastic differential equations is extended to a broad, new class of nonlinear dynamical equations with random coefficients and initial conditions. This work encompasses previous results for classical systems with random forces and initial conditions with arbitrary statistics, and provides results for systems with nonlinear interactions which are nonlocal in time. Closed equations of motion for the correlation and response functions were derived which have applications in the calculation of particle motion in stochastic magnetic fields and in the description of electromagnetic plasma turbulence. As an illustration of the results for nonlocal interactions and non-Gaussian initial conditions, the electromagnetic dispersion tensor was calculated to first order in renormalized perturbation theory. Dissert. Abstr.

N82-18007# Nagoya Univ. (Japan). Inst. of Plasma Physics.
RECOMMENDED VALUES OF TRANSPORT CROSS SECTIONS FOR ELASTIC COLLISION AND TOTAL COLLISION CROSS SECTION OF ELECTRONS IN ATOMIC AND MOLECULAR GASES
Makoto Hayashi Nov. 1981 66 p refs
(IPPJ-AM-19) Avail: NTIS HC A04/MF A01

Recommended values are presented for the integral, momentum-transfer and viscosity cross sections for elastic collisions and total collision cross section of electrons in He, Ne, Ar, Kr, Xe, H2, N2, O2, CO and CO2. A wide range of electron energies (.001 to 10,000 eV) is considered, but emphasis is placed on the 1 - 1,000 eV range. A comprehensive list of references for the relevant cross sections is given. Author

N82-18008# Nagoya Univ. (Japan). Inst. of Plasma Physics.
THE DYNAMICS OF MICROPROCESSES AND CURRENT TURBULENT HEATING OF IONS IN URAGAN-2 STELLARATOR
N. F. Perepelkin (Ukrainian Academy of Sciences, Kharkov), V. A. Suprunenko, A. S. Slavny, M. P. Vasilev, A. G. Dikii, V. D. Kotsubanov, B. V. Kravchin, and A. E. Kulaga Oct. 1981 41 p refs
(IPPJ-548) Avail: NTIS HC A03/MF A01

Noise spectra and UHF radiations within a wide range of electron cyclotron, electron plasma and ion plasma frequencies were investigated in 'Uragan-2' stellarator. Threshold dependences on electrical and magnetic fields of kinetic instability excitations were studied as well as of ion heating and disruption of quasi-stationary run away of electrons in a plasma heated by a powerful current pulse in high magnetic fields. Near omega sub ce/omega sub pe approximately = 1, the threshold character of growth of hot ion number and energy, as well as of the excitation of epithermal nonstationary electromagnetic radiations on Langmuir frequency and ion plasma frequency harmonics were connected with the ion acoustic turbulence and the processes of nonlinear sound transformation. These effects are increased with the rise of magnetic field strength and are followed by the drop of a resistance absolute value. At the rise of electrical field strength no restrictions in injection of high ohmic power into a plasma and ion temperature rise were observed. The results of ion heating in Tokamaks were compared. Author

N82-18009# Nagoya Univ. (Japan).
NEW EXCITATION AND IONIZATION MECHANISM OF IONS IN DENSE PLASMAS: THE ROLE OF AUTOIONIZING STATES
Takashi Fujimoto and Takako Kato Oct. 1981 15 p refs
(IPPJ-549) Avail: NTIS HC A02/MF A01

It is shown that, in dense plasmas, dielectronic capture into doubly excited ionic states followed by the ladder like excitation ionization chain becomes important in the excitation ionization process of ions. For an example of a hydrogen like ion, its contribution to the excitation Is yields 2s, 2p as well as to the ionization was evaluated by the method of the quasisteady state solution to the rate equations. The increase is found to be substantial, i.e., by more than a factor of two both for the excitation and ionization rate coefficients. Author

N82-18010# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EXPERIMENTAL DETERMINATION OF THE ELECTRON ENERGY DISTRIBUTION FUNCTION IN PLASMAS
Tetsuya Akitsu Jun. 1981 12 p refs Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2107-RPE/333) Avail: NTIS HC A02/MF A01

The energy distribution function of electrons is measured by the Druyevestein method using a pulsed electrostatic probe circuit. The electronic circuit developed for the measurement and the experimental results obtained in a double plasma machine are described. R.J.F.

N82-18011# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).
FIRST-ORDER TOROIDAL CORRECTION TO THE MINIMUM ENERGY STATE OF A CYLINDRICAL PLASMA COLUMN OF FINITE BETA
W. Schuurman and J. W. Edenstrasser (Innsbruck Univ.) Aug. 1981 19 p refs Sponsored by Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek and Euratom
(Grant S-18/03)
(Rept-81-133) Avail: NTIS HC A02/MF A01

An inverse aspect ratio expansion was used to formulate a first-order toroidal correction to the minimum energy equilibrium state of a cylindrical plasma column of finite beta, embedded in a vacuum region. The use of this correction improves the comparison between the theoretical model, set up for a rotationally symmetric straight cylinder, and the toroidal pinch experiments. The comparison demands the numerical evaluation of an integral with an apparent singularity at the plasma axis, and matching of four parameters to approprimate boundary conditions. A.R.H.

N82-18012# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
GRAPHS OF ANOMALOUS ENERGY CONFINEMENT TIMES FOR ASDEX, INTOR, JET, PLT, TFTR AND ZEPHYR
H. K. Wimmel Jul. 1980 55 p refs
(IPP-6/200) Avail: NTIS HC A04/MF A01

Anomalous transport due to the dissipative trapped-ion instability, anomalous heat conductivity of electrons, and neoclassical heat conductivity of ions are considered. The energy confinement time resulting from the combined effects is represented graphically as a function of the mean temperature and for several values of the mean density for the following Tokamaks: ASDEX, INTOR, JET, PLT, TFTR, and ZEPHYR.
Author

N82-18013# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
MODEL CALCULATIONS OF THE TEARING INSTABILITY ASSOCIATED WITH AC-MODULATION OF THE PLASMA-CURRENT IN TOKAMAKS
F. Pohl, S. vonGoeler, W. Engelhardt, K. Lackner, and M. Murmann Jun. 1980 63 p refs
(IPP-6/198; IPP-III/60) Avail: NTIS HC A04/MF A01

An experiment was performed on the pulsator Tokamak at Garching in which an ac component was superposed on the plasma current. To interpret and plan these experiments, a computer program was developed to calculate the current distributions accompanying the ac modulation taking into account the skin effect. The experiments show that ac modulation of high amplitude impairs the plasma stability and can lead to disruption. Since tearing modes are believed to be responsible for the disruptive instability, calculations on the stability of these modes were performed. The computer program and its results are described. The skin effect, the stability of tearing modes, and the heating effects associated with ac modulation are discussed. Computer program documentation is included. A.R.H.

N82-18014# California Univ., Berkeley. Electronics Research Lab.
STABILIZATION OF THE LOWER HYBRID DRIFT INSTABILITY BY RESONANT ELECTRONS
Yu-Jiuan Chen, William M. Nevins (California Univ., Livermore), and Charles K. Birdsall 16 Sep. 1981 30 p refs
(Contracts N00014-77-C-0578; W-7405-eng-48)
(AD-A107652; UCB/ERL-M81/72) Avail: NTIS

HC A03/MF A01 CSCL 20/9

The lower hybrid drift instability was studied with a two dimensional electrostatic simulation code. Simulations showed good agreement of the measured local growth rates and frequencies with the results of local theory during the early stage of wave growth. At later times nonlocal effects become important, and a coherent mode structure develops. This normal mode was observed to propagate up the density gradient. At zero plasma beta and zero electron temperature, we found that the lower hybrid drift instability is stabilized by the local current relaxation due to both ion quasilinear diffusion and electron E x B trapping which causes electron heating to occur. Author (GRA)

N82-18015# California Univ., Berkeley. Electonics Research Lab.

ROTATIONAL INSTABILITIES IN THE FIELD-REVERSED THETA PINCH: RESULTS OF HYBRID SIMULATIONS

Douglas S. Harned 14 Sep. 1981 36 p refs

(Contract N00014-77-C-0578)

(AD-A107651; UCB/ERL-M81/70) Avail: NTIS HC A03/MF A01 CSCL 20/9

Rotational instabilities in rigidly rotating field-reserved theta pinch equilibria are studied using a quasineutral hybrid simulation code. We observe unstable $m=2$ modes at levels of ion rotation below instability thresholds predicted by finite Larmor radius fluid theory. Nonlinear effects are found to reduce the growth rate and lower the real frequency of the $m=2$ mode at large amplitude. Instabilities with $m>2$ have been observed for some strongly reversed cases. It is also found that growth rates for these instabilities can be greatly reduced by increasing the ratio of the plasma radius to the ion Larmor radius. Author (GRA)

N82-18016# California Univ., Berkeley. Electronics Research Lab.

REVIEW OF THE LOWER HYBRID DRIFT INSTABILITY AND ITS SATURATION MECHANISMS

Yu-Jiuan Chen 20 Aug. 1981 15 p refs

(Contract N00014-77-C-0578)

(AD-A107550; UCB/ERL-M81/60) Avail: NTIS HC A02/MF A01 CSCL 20/4

A survey is given of previous research on the linear theory of the lower hybrid drift instability (Sec. I). A summary is made of research recently completed as well as research currently in progress on the nonlinear theory and computer simulations of the lower hybrid drift instability (Sec. II). Author (GRA)

N82-18017# Naval Research Lab., Washington, D. C.

STEADY-STATE PLANAR ABLATIVE FLOW Interim Report

W. M. Manheimer, D. G. Colombant, and J. H. Gardner 18 Nov. 1981 32 p refs

(Contract DE-AI08-79DP-40092)

(AD-A107601; NRL-MR-4644) Avail: NTIS HC A03/MF A01 CSCL 20/9

Steady state planar ablative flow in a laser produced plasma is studied. Our calculations relate all steady state fluid quantities to only three parameters, the material, absorbed irradiance and laser wavelength. The fluid is broken into three regions; the subcritical expanding plasma, the steady state ablation front and the accelerated slab. Boundary conditions at the interfaces of these regions are given. If the absorbed irradiance is nonuniform, the nonuniformity in ablation pressure is calculated. Results are compared with experiment and fluid simulation for both uniform and nonuniform illumination. Author (GRA)

N82-18018# Naval Research Lab., Washington, D. C. Plasma Physics Div.

ELECTRON CYCLOTRON RESONANCE HEATING OF TANDEM MIRRORS AT RELATIVISTIC ENERGIES Interim Report

Bertram H. Hui, K. H. Chu, and Thomas Antonsen 16 Nov. 1981 9 p refs Sponsored by DOE

(AD-A107944; NRL-MR-4511) Avail: NTIS HC A02/MF A01 CSCL 18/1

Successful operation of a tandem mirror fusion reactor is critically dependent on electron cyclotron resonance heating. We find that for proof-of-principle parameters, this frequency is more than a factor of two lower than the nonrelativistic cyclotron frequency. Presently available sources can provide relatively high power at this frequency. Author (GRA)

N82-18019# Naval Research Lab., Washington, D. C.

RESISTIVE INTERCHANGE MODES IN REVERSED FIELD PINCHES Interim Report

John M. Finn (Science Applications, Inc., McLean, Va.) and Wallace M. Manheimer 24 Nov. 1981 21 p refs

(Contract EX-76-A-34-1006)

(AD-A108129; NRL-MR-4520) Avail: NTIS HC A02/MF A01 CSCL 02/9

A new regime is found in which the growth rate of the resistive interchange mode in cylindrical geometry is considerably smaller than previously believed. This stabilization is due to coupling to the external, tearing stable, region. Considering the crossover point from the conventional resistive interchange to the new regime as a critical beta, beta sub c, we find beta sub c about 7% for classical resistivity with T sub e = 10 eV, in agreement with recent numerical studies. However, beta sub c scales as T sub e to the -3/5th power, giving beta sub c about 1% for T sub e = 1 keV. Marginally stable pressure profiles for totally localized modes in the Bessel function model for a reversed field pinch are also computed, and show that the central pressure may be up to 400 times the pressure at the wall. Author (GRA)

N82-18020# TRW Defense and Space Systems Group, Redondo Beach, Calif.

MICROWAVE PLASMA SOURCE FOR NEUTRAL-BEAM INJECTION SYSTEMS Quarterly Technical Progress Report

15 Aug. 1981 26 p

(Contract DE-AC03-81ER-52071)

(DE81-029122; DOE/ER-52071/T2; SN-36833) Avail: NTIS HC A03/MF A01

The overall program is described and the technical and programmatic reasons for the decision to pursue both the RFI and ECH sources into the current hydrogen test stage is discussed. The general characteristics of plasma sources in the parameter regime of interest for neutral beam applications are considered. The operational characteristics, advantages and potential problems of RFI and ECH sources are discussed. DOE

N82-18021# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.

ON THE RELATION BETWEEN PLASMA AND NEUTRAL GAS PROFILES IN A COLD GAS BLANKET SYSTEM Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)

M. Bures 27 Sep. 1981 19 p refs Sponsored by EURATOM

(TRITA-PFU-81-03; ISSN-0348-7644) Avail: NTIS HC A02/MF A01

A solution for the neutral density profile using measured plasma density and temperature gradients is presented. The fluid model is used. The method indicates that the penetration length for neutrals is underestimated when integrated profiles are used. The ionization rate need not be inferred in the present calculation, because the ionization of neutrals diffusing into the plasma is implicitly included in measured profiles. This calculation is advantageous in the low temperature range where the ionization rate is a strongly varying function of temperature. Results show that the temperature gradient plays the essential role in the determination of the neutral density profile. Author (ESA)

N82-18022# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.

MICROINSTABILITIES IN A RADIALLY CONTRACTING INHOMOGENEOUS CYLINDRICAL PLASMA SLAB. PART 2: LOWER HYBRID AND ELECTRON CYCLOTRON DRIFT INSTABILITIES IN THE PLASMA FOCUS

R. Deutsch and H. J. Kaeppeler Dec. 1980 86 p refs

(IPF-80-13-Pt-2) Avail: NTIS HC A05/MF A01

The frequency, growth rate, turbulent electron and ion heating rates, and the effective collision frequency are calculated for both instabilities in parameter ranges associated with the late compression phase of the plasma focus. Simple analytical formulas were deduced for these parameters. Results indicate a regime in which the lower hybrid drift induced turbulence can heat the

electrons up to a few keV within 10nsec. This result agrees with experimental observations. Author (ESA)

N82-18023# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF HIGH VOLTAGES ON THE PERFORMANCE OF A PLASMA FOCUS Ph.D. Thesis [EXPERIMENTELLE UNTERSUCHUNG DES EINFLUSSES HOHER SPANNUNGEN AUF EINEN PLASMAFOKUS]
Tilman Oppenlaender Jan. 1981 82 p refs In GERMAN
(IPF-81-2) Avail: NTIS HC A05/MF A01

The influence of the application of high voltages for plasma current optimization at constant stored energy on the discharge evolution and the formation of a plasma focus was investigated. Such a current optimization is indicated by the known scaling of neutron yield with plasma current. The plasma diagnostics are described: holographic interferometry for electron density; soft X-ray, using the filter method for electron temperature; silver activation counters for neutron yield; time of flight techniques for neutron energy spectra; and magnetic and electric probes for macroscopic electrical parameters. Results show the expected neutron production scaling with current and typical yields of 10 to the tenth neutrons at 28kJ, 60kV operation. The electron density is about 50% and the production of energetic deuterons about 10 times higher than in other experiments with comparable energies. Neutrons with energy in excess of 5MeV were observed. Author (ESA)

N82-18024# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
MEASUREMENT OF HEAVY ION COMPONENTS IN A HYDROGEN PLASMA BY CO2 LASER SCATTERING WITH COHERENT DETECTION
W. Kasparek and E. Holzhauer Feb. 1981 15 p refs
(IPF-81-5) Avail: NTIS HC A02/MF A01

Ion temperatures and composition were determined in a hydrogen plasma with argon, nitrogen and helium additives. A CO2 hybrid laser beam is focussed into the plasma and the detected spectrum is transformed from IR to RF. After amplification the spectral resolution is obtained from a set of band filters of 20 MHz bandwidth. The mixing term (the high frequency part of the spectrum) is proportional to scattered signal amplitude, which is characteristic for a coherent receiver. In order to obtain the power spectrum the signal is squared, rectified and photographed. Measured spectra agree well with theory. Author (ESA)

N82-18025# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
SPECTROSCOPY OF MOLECULAR PLASMAS AND KINETICS OF EXCITED STATES [SPECTROSCOPIE DES PLASMAS MOLECULAIRES ET CINETIQUES DES ETATS EXCITES]
A. Ricard Mar. 1981 148 p refs In FRENCH
(LP-187) Avail: NTIS HC A07/MF A01

Excited states (radiative and metastable) in a nonequilibrium plasma are defined. Reactions are classified for metastable atoms and selective transfer. Spectroscopy of diatomic molecular emission, applied to the radicals NO, NH, and SiH excited in discharges in mixtures of N2 + O2, N2 + H2, R + O2, R + NH3, etc., where R is a rare gas (Ar), is discussed. It is shown how plasma temperature can be deduced. Measurement methods by optical absorption that are applicable to rare gas metastables and radicals are presented. The use of tunable lasers considerably improves the accuracy of optical absorption measurement. Applications of transfers between excited states in laser physics and in plasma physicochemistry are illustrated. Author (ESA)

N82-18026# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
QUANTUM CORRECTIONS TO THE PROPERTIES OF DENSE PLASMAS [CORRECTIONS QUANTIQUES AUX PROPRIETES DES PLASMAS DENSES]
M. M. Gombert May 1981 259 p refs Partly in FRENCH and ENGLISH
(LP-189) Avail: NTIS HC A12/MF A01

Quantum corrections are considered for the thermodynamic properties of dense plasmas such as found at the center of the Sun or those created by inertial compression fusion. The pseudopotential between two charged particles is discussed. The single component plasma model as well as multicomponent models are treated in terms of perturbation developments in functions of different small parameters, i.e., the plasma parameter, the measure of the quantum diffraction effect, and electron exchange effects. The problem of iron demixing at the center of the Sun is addressed; results show no iron demixing. The effect of quantum corrections on the static thermal microfield in a plasma is also studied as well as Bohm diffusion. Author (ESA)

N82-18027# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
MICROWAVE DISCHARGES
J. Marec, E. Bloyet, M. Chaker, P. Leprince, and P. Nghiem Oct. 1981 66 p refs Presented at Lecture on Electrical Breakdown and Gas Discharges, Les Arcs, France, Jul. 1981
(LP-192) Avail: NTIS HC A04/MF A01

The breakdown conditions of microwave discharges and the difficulties of obtaining them theoretically are reviewed. Classic experimental results are interpreted by the diffusion theory, whose limits and physical meaning are studied. Steady state discharges are described. Plasma columns sustained by a traveling surface wave are discussed. Applications of microwave discharges are outlined, e.g., for spectroscopy studies, in lasers, as ion sources, the stimulation of combustion in order to accelerate burning of lean air-fuel mixtures in internal combustion engines, and in plasma chemistry for the preparation of hydrogenated amorphous silane. Being electrodeless, microwave discharges minimize pollution. Author (ESA)

N82-18028 Auburn Univ., Ala.
ELECTRON TEMPERATURE EVOLUTION AND MACROSCOPIC SIZE OF A VACUUM SPARK DISCHARGE PLASMA Ph.D. Thesis
Robert Edward OConnor 1981 142 p
Avail: Univ. Microfilms Order No. 8127297

The temporal development of the electron temperature of the point plasma formed in a vacuum spark discharge (VSD) is determined at capacitor bank voltages ranging from 6 to 18 kV. The measurement is based on an X-ray absorption technique utilizing three foils (Cr, Mn, and Fe). Bremsstrahlung, radiative recombination, and line radiation are calculated for a coronal equilibrium plasma model. Experimentally obtained ratios of the detector foil combinations over the time profile of the X-ray signals are compared with the theoretically obtained ratios to determine the temporal development of the electron temperature. A peak electron temperature of 2.6 keV was found. The bulk, or macroscopic, plasma formed in the VSD is studied with respect to its physical size, electron temperature, and electron density. Dissert. Abstr.

N82-18029 Brigham Young Univ., Provo, Utah.
MAGNETOHYDRODYNAMIC STABILITY OF STRUCTURALLY STABLE TOROIDAL PLASMAS Ph.D. Thesis
Frederick Cattley Rock 1981 103 p
Avail: Univ. Microfilms Order No. 8126330

The MHD stability of sharp boundary axisymmetric toroidal plasmas with the poloidal field and 'kidney bean' shape implied by the requirements of structural stability (immunity of the magnetic field topology to small perturbations) is investigated. High values of marginal beta (up to 36 percent for R/a = 2) are found. Results are presented for the four magnetic field topologies on the sharp boundary surface with this shape and as a function of elongation. Dissert. Abstr.

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-18030 Columbia Univ., New York.
MAGNETIC CIRCULAR DICHROISM AND FARADAY ROTATION OF CESIUM-ARGON EXCIMERS AND CESIUM

DIMERS Ph.D. Thesis
Muhammad Azadul Islam 1981 81 p
Avail: Univ. Microfilms Order No. 8125310

Direct information about the angular momentum quantum numbers and the angular momentum coupling schemes of excimer molecules was obtained in an experiment in which the MCD and the FR of cesium-argon excimer and cesium dimer absorption bands between 5000 A and 10,000 A were measured for the range of temperature from 116 C to 355 C. The measured MCD data at the blue wing of D2 line clearly shows that the assignment of sigma 2/2 to this excited state, assuming Hund's case (b), is a poor approximation. By a simple inspection of the MCD data it is found that the coupling scheme is more nearly Hund's case (c) than Hund's case (b). The blue wing associated with 5D transition in atomic cesium is devoid of MCD and exhibits strong MCD in the red wings. The yellow-green band associated with 7s-6s transition in atomic cesium shows no MCD. Dissert. Abstr.

N82-18031# State Univ. of New York at Stony Brook.
QUANTUM BEATS IN PHOTOIONIZATION CURRENT Ph.D. Thesis
Ting Shan Luk 1981 80 p
Avail: Univ. Microfilms Order No. 8126234

A quantum beat signal was observed in the total photoionization current from the Zeeman levels of the 3 super 2 P sub 3/2 state. Atoms in a thermal beam were excited to the 3P state by a resonant light pulse, allowed to evolve for about 36 nsec in an applied magnetic field, and then photoionized by a second, optically delayed light pulse. Two dye lasers pumped by the same N2 laser provided the stepwise excitation at 5890A and ionization at about 4060A. Quantum beats from the 3P state's Zeeman structure were observed in the photocurrent as the field was swept from -35 to +35 Gauss. It also has application to increasing the sensitivity of level crossing and quantum beat spectroscopy. Dissert. Abstr.

N82-18032 Yale Univ., New Haven, Conn.
ELECTRONIC EXCITATION OF HELIUM AND KRYPTON BY ELECTRON IMPACT Ph.D. Thesis
Julia Mae Phillips 1981 151 p
Avail: Univ. Microfilms Order No. 8125693

A crossed beam electron impact spectrometer is modified to enable the study of near threshold electronic excitation of He and Kr by electron impact. Absolute differential cross sections for excitation of the individual n = 2 states of He and 3p55s states of Kr are measured within the first four electron volts of threshold. In He pronounced angle dependent structures are apparent in the threshold excitation of the 2p3 state and in the near threshold excitation of the 2S3 state. These experimental observations suggest the existence of a new 2P resonance near 20.8 eV. The results on Kr demonstrate that the angular momentum of the Kr(-) ion core 4p5 has a strong influence on the excitation cross sections, both on the relative magnitudes of the cross sections and on the relative strengths of resonant structures in the excitation functions. The angular momentum of the entire electron cloud of an excited state has less of an effect on the cross sections. Dissert. Abstr.

N82-18033 Columbia Univ., New York.
DEFECT STRUCTURE IN THE ALKALI-GALLATE FAST ION CONDUCTORS Ph.D. Thesis
Michael Paul Anderson 1981 256 p
Avail: Univ. Microfilms Order No. 8125237

For crystals prepared from K2O-Ga2O3 starting materials, the defect responsible for nonstoichiometry is a complex Frenkel defect, which introduces both interstitial oxygen and interstitial potassium into the crystals. For crystals prepared from Na2O- Ga2O3 starting materials, two complementary defect processes occur. The first is the Frenkel defect observed in K beta gallate. The second is the substitutional replacement of Ga(+3) by Na(+) in tetrahedral sites. It is shown that 'self-doping' by Na(+) is responsible for the stabilization of Na beta' gallate. The physical origin of nonstoichiometry is discussed in terms of Pauling's electrostatic valence principle. Models for short range correlations in the crystals are presented. The mixed ion effect was also analyzed. It has been shown that the anomalous drop in conductivity is accompanied by the partioning of mixed ion carriers into different sites. Dissert. Abstr.

N82-18034 Brandeis Univ., Waltham, Mass.
HIGH FIELD NMR STUDIES OF STATIC ORDERING AND SPIN-ENERGY COUPLING IN MnF2 Ph.D. Thesis
Shyam Chandra Das 1981 297 p
Avail: Univ. Microfilms Order No. 8126872

The antiferromagnetic to paramagnetic transition in MnF2 in a 75 kG field applied along [001] was studied using MNR. The time average staggered and uniform magnetizations N and M were obtained respectively from the difference and sum of the NMR frequencies of the two F-19 sites alpha and beta, over the range .12 K < T sub c - T < 6 K. Dissert. Abstr.

N82-18035 Illinois Univ. at Urbana-Champaign.
ENERGY BANDS AND SUPERLATTICE FORMATION IN TITANIUM DISELENIDE Ph.D. Thesis
Bancherd DeLong 1981 120 p
Avail: Univ. Microfilms Order No. 8127579

The superlattice formation in TiSe2 is related to a soft phonon mode near the zone boundary. This mode is supported by a coupling of the electrons at L and the holes at gamma, which causes an anomalously large electronic susceptibility. When the transition occurs, a large portion of the Fermi surface gaps, new electronic states and energy bands are formed, resulting in the lowering of the electronic energy. The 2a x 3a superlattice was directly observed by electron diffraction in dilute Zr-doped TiSe2 crystals. The powerful technique of angle-resolved photoemission spectroscopy has been extended to low temperature. Changes in the energy band structure of TiSe2 due to superlattice formation were observed for the first time. Dissert. Abstr.

N82-18036 Pennsylvania Univ., Philadelphia.
GAUGE-DEPENDENT CRITICAL PROPERTIES OF THE NEMATIC TO SMECTIC-A PHASE TRANSITION IN LIQUID CRYSTALS IN THE 1/N EXPANSION Ph.D. Thesis
Stuart Gordon Dunn 1981 134 p
Avail: Univ. Microfilms Order No. 8127018

A generalized de Gennes model for the nematic to smectic-A transition with a N complex component order parameter, Psi, is studied in the 1/N-expansion. A continuum of gauges parameterized by an angle Theta with Theta = 0 (Theta = Pi/2) corresponding to the physical (LC) and SC gauges is introduced. Isotropic and anisotropic critical behavior is found as the Epsilon expansion. The susceptibility Chi sub LC in the LC gauge is related to that Chi sub SC, in the SC gauge via Chi sub LC = Chi sub SC to the exp(g) power, where g is negative and more than logarithmically singular in reduced temperature t and wave number q near criticality, because the splay elastic constant K sub 1 to the 0 behaves as a dangerous irrelevant variable. Dissert. Abstr.

N82-18037 Illinois Univ. at Urbana-Champaign.
OPTICAL CHARACTERIZATION OF THIN METALLIC AND SEMICONDUCTING FILMS IN THE FAR INFRARED Ph.D. Thesis
Mark Stuart Durschlag 1981 119 p
Avail: Univ. Microfilms Order No. 8127582

The performance in a CW optically pumped air infrared (fir) laser of a hybrid metal mesh-dielectric mirror consisting of an assembly of thin metallic and semiconducting films is evaluated. Its construction is described and an overview of theoretical approaches predicting its optical properties is outlined. From the general model which best agrees with the experimentally determined transmission a simplified model is derived and shown to maintain sufficient accuracy to warrent its further utilization. Ultra-thin semiconducting heterostructures are also examined using fir techniques. In particular, it is shown that by fitting a calculated reflectivity based on a simple classical model to the fir reflectivity obtained experimentally, both electrical (free carrier concentration, mobility) and lattice (polar phonon frequencies) parameters can be obtained with reasonable accuracy. Dissert. Abstr.

N82-18038 Illinois Univ. at Urbana-Champaign.
MOSSBAUER STUDIES ON PARTIALLY ORIENTED

SAMPLES OF CARBON MONOXYMYOGLOBIN AND PHOTODISSOCIATED CARBON MONOXYMYOGLOBIN Ph.D. Thesis
Richard Maury Emberson, Jr. 1981 149 p
Avail: Univ. Microfilms Order No. 8127586

Iron-57 studies on partially oriented samples of carbon monoxymyoglobin (MbCO) and photodissociated carbon monoxymyoglobin (Mb*CO) are reported. The spectrum of each Mb species consists of a doublet which is the result of the quadrupole interaction with the electric field gradient (EFG) at the Fe-57 nucleus. The photo-produced partial orientation affects the intensity ratio R of the two lines; measurements of R versus the fraction MbCO remaining allows the determination of the asymmetry parameter eta of the EFG and the angle psi between its principal axis and the normal to the optical axis, which coincides with the heme normal. The feasibility was demonstrated of such an experiment by measuring eta and psi for MbCO and Mb*CO. Dissert. Abstr.

N82-18039 Brandeis Univ., Waltham, Mass.
THE FERMI SURFACE RECONSTRUCTED MOMENTUM DENSITY OF V3Si FROM POSITRON ANNIHILATION EXPERIMENTS Ph.D. Thesis
William Sidney Farmer 1981 258 p
Avail: Univ. Microfilms Order No. 8126873

The angular correlation of annihilation radiation (ACAR) technique was used to provide information about the electron positron momentum density via point slit distributions. Each two dimensional distribution corresponds to an integral of the three dimensional momentum density. Two dimensional point slit distributions were measured for seven V3Si crystal orientation using 64 detector ACAR apparatus. A circular averaging technique extracted the small oscillations from the nearly Gaussian ACAR distributions and displayed them clearly. A reconstruction algorithm computed the three dimensional momentum density from six of the ACAR distributions. Model densities were produced from some recent A15 APW band calculations and are compared to the reduced reconstructed ACAR result. Dissert. Abstr.

N82-18040 Illinois Univ. at Urbana-Champaign.
SURFACE ANALYSIS APPLIED TO THIN FILMS OF MOLECULAR SOLIDS Ph.D. Thesis
Robert Edgar Davis 1981 149 p
Avail: Univ. Microfilms Order No. 8127577

Auger depth profiling was established as a reliable technique for determining the elemental composition in depth of phthalocyanine/phthalocyanine (Pc/Pc) and Pc/metal interfaces initially. The mechanisms which can lead to physical and chemical degradation of these interfaces with time were also examined. A variety of techniques were relied upon to study the chemical degradation of FePc which took place during annealing in air. The question of a molecular sputtering mechanism is addressed. Using the results obtained from these AES studies, the technique of SIMS was evaluated for the analysis in depth of molecular solids. The method has advantages which allow the identification of silver on the surface of unannealed Pc/Ag/glass assemblies. The presence of silver was not detectable by AES due to spectral overlap, and had not been anticipated by previous researchers. Some preliminary results with polymer film assemblies were presented. Dissert. Abstr.

N82-18041*# California Univ., Irvine. Dept. of Physics.
HARMONIC AND ANHARMONIC PROPERTIES OF DIAMOND STRUCTURE CRYSTALS WITH APPLICATION TO THE CALCULATION OF THE THERMAL EXPANSION OF SILICON Ph.D. Thesis. Final Report
Keith Herbert Wanser Dec. 1981 288 p refs
(Grant NsG-7472)
(NASA-CR-168437) Avail: NTIS HC A13/MF A01 CSCL 20L

Silicon has interesting harmonic and anharmonic properties such as the low lying transverse acoustic modes at the X and L points of the Brillouin zone, negative Gruneisen parameters, negative thermal expansion and anomalous acoustic attenuation. In an attempt to understand these properties, a lattice dynamical model employing long range, nonlocal, dipole-dipole interactions was developed. Analytic expression for the Gruneisen parameters of several modes are presented. These expressions explain how the negative Gruneisen parameters arise. This model is applied to the calculation of the thermal expansion of silicon from 5K to 1700K. The thermoelastic contribution to the acoustic attenuation of silicon is computed from 1 to 300 K. Strong attenuation anomalies associated with negative thermal expansion are found in the vicinity of 17K and 125K. S.L.

N82-18042# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A MODEL FOR ELECTRONS EXISTING IN HYBRIDIZED NARROW AND WIDE BANDS
R. Kishore Jun. 1981 21 p refs Presented at the 33rd Ann. Meeting of SBPC., Salvador, Brazil, 8-15 Jul. 1981 Submitted for publication
(INPE-2127-RPE/351) Avail: NTIS HC A02/MF A01

A model is proposed for electrons existing in hybridized narrow and wide bands which occur in the transition metals, the mixed valence systems of rare earth metals and their compounds, and the doped semiconductors. The model is derived from the standard basis operator (SBO) form of the extended Anderson model, originally proposed for the dilute magnetic alloys. Equations of motion method was used to obtain the SBO's Green's functions, and thereby the spectrum of the quasi-particle excitations. For the translationally invariant systems, the possiblity of the nonmetallic behavior and the metal-nonmetal transition for the nonintegral number of electrons per lattice site is described. B.W.

N82-18043*# Rensselaer Polytechnic Inst., Troy, N. Y.
CRYSTAL GROWTH FROM THE VAPOR PHASE EXPERIMENT MA-085, SECTION 7 Final Report
H. Wiedemeier, H. Sadeek, F. C. Klaessig, M. Norek, and R. Santandrea [1982] 40 p refs
(Contract NAS8-30578)
(NASA-CR-161965) Avail: NTIS HC A03/MF A01 CSCL 20B

The positive effects of microgravity on crystal quality and the fundamental properties of the vapor transport reaction were established by analyzing the results of three transport experiments on multicomponent systems performed during the Apollo-Soyuz Test Project mission. The systems employed were GeSe0.99Te0.01 - GeI4, GeS0.98Se0.02 - GeCl4, and GeS-GeCl4-Ar. The crystallographic analysis is based on a direct comparison of space and ground-based (prototype) crystals employing X-ray diffraction, microprobe, microscopic, and chemical etching techniques. The results demonstrate a considerable improvement of the space-grown crystals in terms of chemical and crystalline homogeneity, surface morphology, and bulk perfection relative to ground specimens. The confirmation of greater mass transport rates than predicted for microgravity by present vapor transport models is of basic scientific and practical importance for the improvement of transport models and techniques on Earth and for the development of a transport model for space conditions. R.J.F.

N82-18044*# Massachusetts Inst. of Tech., Cambridge.
QUANTITATIVE DETERMINATION OF ZERO-GRAVITY EFFECTS ON ELECTRONIC MATERIALS PROCESSING GERMANIUM CRYSTAL GROWTH WITH SIMULTANEOUS INTERFACE DEMARCATION EXPERIMENT MA-060, SECTION 5 Final Report
H. C. Gatos, A. F. Witt, M. Lichtensteiger, and C. J. Herman [1982] 65 p refs
(Contract NAS8-30576)
(NASA-CR-161964) Avail: NTIS HC A04/MF A01 CSCL 20B

The crystal growth and segregation characteristics of a melt in a directional solidification configuration under near zero g conditions were investigated. The germanium (doped with gallium) system was selected because it was extensively studied on Earth and because it lends itself to a very detailed macroscopic and microscopic characterization. An extensive study was performed of the germanium crystals grown during the Apollo-Soyuz Test Project mission. It was found that single crystal growth was achieved and that the interface demarcation functioned successfully. On the basis of the results obtained to date, there is no indication that convection driven by thermal or surface tension gradients was present in the melt. The gallium segregation, in the absence of gravity, was found to be fundamentally different

in its initial and its subsequent stages from that of the ground based tests. None of the existing theoretical models for growth and segregation can account for the observed segregation behavior in the absence of gravity. B.W.

N82-18045# Rockwell International Corp., Thousand Oaks, Calif.
RESEARCH IN LPE OF DOPED LnIbOsub3 AND LiTaOsub3 THIN FILMS Final Report, 1 Apr. 1977 - 31 Mar. 1981
R. R. Neurgaonkar Jun. 1981 55 p refs
(Contract F49620-77-C-0081; AF Proj. 2306)
(AD-A107686; ERC41004.11FR; AFOSR-81-0721TR) Avail: NTIS HC A04/MF A01 CSCL 20/2

The crystal chemical approach has been shown to be successful in improving the temperature stability of ferroelectric LiNbO3 phase. LiNbO3 films doped with cations that are larger than Li+ and Nb5+, e.g., Na+, Na+ + Ta5+, Ag+, Co2+ + Zr4+, etc., have successfully been grown by the liquid phase epitaxial (LPE) technique using the vanadium containing flux systems. X-ray diffraction studies indicate that the films grown from the vanadium containing fluxes have a high single crystallinity with good epitaxy. To date, the temperature coefficient of SAW velocity was reduced by 40%; this translates into 40% improvement in the temperature stability of LiNbO3 SAW devices. This is a significant result in the present work and opens a new interest in the LiNbO3 family for SAW application. By using such a novel approach, it should be possible to improve the temperature stability of other important structural families such as quartz or tungsten bronze structural family compositions.GRA

N82-18046# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
ELECTRONIC STRUCTURE OF GRAIN BOUNDARIES AND INTERFACES IN POLYCRYSTALLINE ZINC OXIDE
M. H. Sukkar, H. L. Tuller, and K. H. Johnson 18 Nov. 1981 9 p refs
(Contract N00014-81-K-0299; NR Proj. 056-757)
(AD-A107864; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20/2

Preliminary theoretical models for the electronic structure of grain boundaries and interfaces in polycrystalline ZnO have been constructed on the basis of self-consistent-field-X-alpha scattered-wave (SCF-X alpha-SW) cluster molecular-orbital calculations. The disposition and character of the interface states, relative to the valence and conduction bands of the otherwise perfect crystalline material, have been studied for clusters representing coordinatively unsaturated Zn surface sites and molecular O2 chemisorption thereon. The possible effects of the resulting interface states on electron transport at grain boundaries in ZnO varistors have been addressed. GRA

N82-18047# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
PREPARATION OF InP BY SOLUTION AND MELT GROWTH TECHNIQUES Final Technical Report, 1 Nov. 1978 - 30 Nov. 1980
August F. Witt Griffiss AFB, N.Y. RADC Sep. 1981 17 p refs
(Contract F19628-79-C-0042; AF Proj. 4600)
(AD-A107646; RADC-TR-81-231) Avail: NTIS HC A02/MF A01 CSCL 20/2

A modified InP synthesis system has been designed, constructed and put into operation. Basic studies on InP growth have been initiated and deficiencies inherent to the growth system identified. The nature of the effects of liquid encapsulation has been studied using Ga-doped Ge as a model system.
Author (GRA)

N82-18048# Oklahoma State Univ., Stillwater. Dept. of Physics.
STUDY OF DEFECTS PRODUCED BY THE GROWTH, POST TREATMENT AND FABRICATION OF QUARTZ Interim Report, 15 Apr. 1980 - 15 Apr. 1981
Larry E. Halliburton, Joel J. Martin, and William A. Wibley Griffiss AFB, N.Y. RADC Oct. 1981 82 p refs
(Contract F19628-80-C-0086; AF Proj. 2306)
(AD-A107771; RADC-TR-81-276) Avail: NTIS HC A04/MF A01 CSCL 20/6

We are using a number of experimental techniques to investigate the various as grown and radiation-induced defects in commercially available high-quality synthetic quartz. Interstitial ions such as H(+), Li(+), and Na(+) as well as radiation-induced holes trapped at oxygen ions act as charge compensator's located adjacent to the aluminum and this gives rise to Al-OH(-), Al-Li(+), Al-Na(+), and Al-hole centers. Absolute concentrations of these compensated aluminum centers have been determined as a function of irradiation and annealing temperature for a variety of samples, both swept and unswept. The various treatments simply exchange one type of compensator for another at the aluminum sites and, within experimental error, the sum of the aluminum centers remains constant for a given sample. This direct accountability of all the aluminum ions in hydrogen-swept samples strongly suggests that the 1/3306 cm and 1/3367 cm infrared bands are associated with the Al-OH(-) center. Also, the ESR and IR results show that the aluminum content of randomly selected bars of high-quality quartz can vary by an order of magnitude. Acoustic loss measurements on a 5 MHz 5th overtone resonator blank show no loss peaks that can be attributed to the Al-Li(+) center. A series of oxygen-vacancy-associated centers have been discovered by ESR. An investigation of the thermally stimulated luminescence, TSL, from quartz irradiated at 95 K has been made below room temperature. GRA

N82-18049# Rutgers - The State Univ., Piscataway, N. J. High Pressure Research Lab.
POLARIZATION MECHANISMS IN PHASE 2 POLY (VINYLIDENE FLUORIDE) FILMS Interim Technical Report
B. A. Newman, J. I. Scheinbeim, C. H. Yoon, and K. D. Pae 12 Nov. 1981 46 p refs
(Contract N00014-75-C-0540; NR Proj. 356-564)
(AD-A107850; TR-24) Avail: NTIS HC A03/MF A01 CSCL 07/4

Unoriented phase 2 films were poled with fields up to 3.2 MV/cm at room temperature. A determination of the piezoelectric strain coefficent provided a measure of the residual polarization achieved, while an X-ray diffraction study provided information about field-induced phase changes which appeared to be related directly to the residual polarization. In an unoriented film, crystals make all possible orientation with respect to the poling field and different polarization mechanisms appear to depend on the crystal orientation. A number of different polarization mechanisms are discussed. A new crystal form for Poly(Vinylidene Fluoride) (PVF2) was observed. Author (GRA)

N82-18050# California Univ., Los Angeles. Dept. of Chemistry.
SPECTRAL DIFFUSION IN ORIENTATIONALLY DISORDERED ORGANIC SOLIDS Interim Technical Report
Paras N. Prasad (New York State Univ. at Buffalo), Jack R. Morgan, and Mostafa A. El-Sayed 20 Nov. 1981 16 p refs Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A107950; TR-39) Avail: NTIS HC A02/MF A01 CSCL 20/2

The spectral diffusion within the inhomogeneous linewidth of the T1 from S0 transition is presented for an orientationally disordered organic solid under the condition when kT (approximately 3/cm) is much smaller than the inhomogeneous linewidth (approximately 83/cm). The rate of the transfer is found to increase as the site energy increases. This result is explained in terms of a phonon assisted undirectional (high to low) energy transfer process in which the increasing density of the low energy sites (acceptors) with an increase in the excitation energy plays an important role. GRA

N82-18051# Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
STUDY OF GRAIN-BOUNDARY SEGREGATION USING THE AUGER ELECTRON EMISSION TECHNIQUE Final Report, 1 Sep. 1971 - 31 Mar. 1981
D. F. Stein and L. A. Heidt 1981 5 p refs
(Contract DE-AS02-76ER-02166)
(DE82-000789; DOE/ER-02166/27) Avail: NTIS HC A02/MF A01

Several phenomena were investigated by surface analytical methods. They include: correlation of embrittlement and grain

boundary segregation; intergranular corrosion; stress corrosion cracking of copper alloys; embrittlement of Ni-Cu by hydrogen and liquid metals; beneficial segregants in creep rupture phenomena; and analytical and theoretical studies. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-18052 State Univ. of New York at Stony Brook.
INTERACTING QUANTUM FIELD THEORY IN CURVED SPACE-TIME Ph.D. Thesis
Richard Gordon Gass 1981 133 p
Avail: Univ. Microfilms Order No. 8126242

The status of interaction quantum field theory in curved space-time was surveyed and several new results were obtained. The use of the renormalization group in curved space-time is discussed and the equation governing the effective conformal coupling xi (kappa) is derived for phi 4 and phi 3. The t(prime) Hooft pole equation for the conformal coupling constant counterterms is derived. Using dimensional regularization phi 3 is renormalized at the one-loop level in a six-dimensional conformally flat space-time. It is shown that if x is treated as a renormalizable coupling constant then phi 3 in a six-dimensional conformally flat space-time is not renormalized at the two-loop level due to the noncancellation of the state dependent infinities. The implications of this are discussed. Dissert. Abstr.

N82-18053 State Univ. of New York at Stony Brook.
TOPICS IN ULTRAVIOLET AND INFRARED PROPERTIES OF PERTURBATIVE QUANTUM FIELD THEORY Ph.D. Thesis
Sunil Mukhi 1981 112 p
Avail: Univ. Microfilms Order No. 8127115

An algorithm was developed to study ultraviolet divergences of the most general real supersymmetric non-liner sigma model in two dimensions, order by order in perturbation theory, using the background field method. The one- and two-loop divergences of this class of models are then explicitly calculated, using the manifestly supersymmetric formulation of perturbation theory in terms of the so-called supergraphs. The results of these calculations are that models defined on Ricci-flat manifolds have no one-or two-loop divergences, while models defined on symmetric spaces or Einstein spaces have no two-loop divergences. The dependence of the cross-section for the process e(+) e(-) yields two hadronic jets is examined in perturbative quantum chromodynamics. An algorithm is obtained by which the sum of all logarithms (in all orders of perturbation theory) of the 'jet parameters' can be calculated to any desired accuracy, in the approximation in which terms suppressed by inverse powers of large energies are neglected. Dissert. Abstr.

N82-18054*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CALCULATION OF THE THERMODYNAMIC PROPERTIES OF A MIXTURE OF GASES AS A FUNCTION OF TEMPERATURE AND PRESSURE
Gilberto Colon Dec. 1981 22 p refs Revised
(NASA-TM-83861) Avail: NTIS HC A02/MF A01 CSCL 20M

The evaluation of the thermodynamic properties of a gas mixture can be performed using a generalized correlation which makes use of the second virial coefficient. This coefficient is based on statistical mechanics and is a function of temperature and composition, but not of pressure. The method provides results accurate to within 3 percent for gases which are nonpolar or only slightly polar. When applied to highly polar gases, errors of 5 to 10 percent may result. For gases which associate, even larger errors are possible. The sequences of calculations can be routinely programmed for a digital computer. The thermodynamic properties of a mixture of neon, argon and ethane were calculated by such a program. The result will be used for the design of the gas replenishment system for the Energetic Gamma Ray Experiment Telescope. Author

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-18055*# National Aeronautics and Space Administration, Washington, D. C.
NASA'S UNIVERSITY PROGRAM: ACTIVE PROJECTS, FISCAL YEAR 1981
1981 345 p
(NASA-TM-84416) Avail: NTIS HC A15/MF A01 CSCL 05A

Active university R and D activities funded by NASA which contribute to mission needs are documented. Technical rather than fiscal information is emphasized. A classification of government sponsored research is included. A cross index providing access to the project description is also included. N.W.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-18056# Commission of the European Communities, Ispra (Italy). Joint Research Center.
ORDER: A PROGRAM PACKAGE FOR INFORMATION ON MANAGEMENT OF STAFF ACTIVITIES AND EXPENDITURES
J. Eder, C. Pagny, and H. Reylander 1981 46 p Partly in ENGLISH and FRENCH Submitted for publication
(EUR-7442-EN) Avail: NTIS HC A03/MF A01

A set of two programs for information on management of staff activity and expenditures executed by a Division or other unit is presented. In order to render a detailed and transparent account for the employment of staff and for the utilization of resources, computer programs were developed. The base is given by existing staff, previsions on how to employ these persons in the scope of certain research programs (jobs), and accorded credits. A monthly updating data input consists of actual working time of each person employed for the job to which he is engaged and expenditures. This data is compiled in data sets on disk. The program allows elaboration and sorting of various listings, the most important of them being: (1) staff and organization of the Division; (2) activity and budget reports; and (3) orders and other expenditures. J.M.S.

N82-18057# Army Construction Engineering Research Lab., Champaign, Ill.
EXPECTED USE OF MICRO-BASED NETWORK ANALYSIS Final Report
Carl E. DeLong and Janet H. Spoonamore Nov. 1981 22 p refs
(DA Proj. 4A7-62731-AT-41)
(AD-A107660; CERL-TM-P-122) Avail: NTIS HC A02/MF A01 CSCL 05/1

Over the next decade, engineers have an excellent opportunity to use available low-cost, micro-based hardware. Network analysis is a suitable software tool for managing small and large, simple and complex project networks even on the small machines. One may ask whether and how engineers will use micro-based network analysis given its limited use in the past. Data on the current construction projects indicate that engineers will not quickly and easily adapt these micro-based tools. The same data also suggest that established users will more and more depend on their micro computers. Author (GRA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-18058# Commission of the European Communities, Ispra (Italy).
AN INTEGRATED SCHEME FOR NDA DATA EVALUATION
S. Guardino 1 Dec. 1980 10 p refs Presented at 2nd Advisory Group on the NDA Quality of Data, Vienna, 10-14 Nov. 1980
Avail: NTIS HC A02/MF A01

The general scheme of a computer program developed to aid in the analysis of the NDA data evaluation is presented. The scheme is designed to be compatible with the use of fully automated instruments. The procedures discussed include collection of NDA data in the plant, recording the data on magnetic tape cassettes, and reprocessing of the raw measurement and recorded data to indicate quality indexes. J.M.S.

N82-18059# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
IMPLEMENTATION OF A DISPLAY ROUTINE FOR CODED MAP DATA BASES
Tomas Claesson Sep. 1981 28 p refs
(FOA-C-30241-E) Avail: NTIS HC A03/MF A01

The implementation of a display routine for coded map data bases is presented. The display routine is a decoder for the Display RC-code. This code enables efficient coding of binary images, and combines storage efficiency with accessibility. Author

N82-18060# National Bureau of Standards, Washington, D.C.
FEDERAL REQUIREMENTS FOR A FEDERAL INFORMATION PROCESSING STANDARDS DATA DICTIONARY SYSTEM
Patricia A. Konig, Judith J. Newton, and Roy G. Saltman Sep. 1981 81 p
(PB82-117607; NBSIR-81-2354) Avail: NTIS HC A05/MF A01 CSCL 05B

Information and prliminary conclusions about Federal agencies' requirements for a Federal Information Processing Standard Data Dictionary System are presented. Some initial requirements were identified through analysis of comments made on the Prospectus for Data Dictionary System Standard which describes NBS' efforts to develop a standard. Most of the data used to develop preliminary conclusions on Federal requirements was collected during interviews with Federal Government users and developers of Data Dictionary Systems. Comments received on the Prospectus and data collected during the interviews are summarized. Preliminary conclusions and issues being investigated also are presented. GRA

N82-18061# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
A SURVEY OF STANDARDIZATION EFFORTS OF CODED CHARACTER SETS FOR TEXT PROCESSING Final Report
Joan E. Knoerdel Sep. 1981 55 p refs
(PB82-105891; NBS-SP-500-81; LC-81-600108) Avail: NTIS HC A04/MF A01 CSCL 05B

A description of the major national and international standards organizations which develop code standards is included. Next, the various code standards are described according to the following categories: basic code sets for information interchange, methods of augmenting those basic code sets, additional control characters to be used with the basic code sets, and code sets developed specifically for text communications, limitations which still exist when interchanging information via communicating text processors are discussed. GRA

N82-18062# National Bureau of Standards, Washington, D.C. Technical Information and Publications Div.
PUBLICATIONS OF THE NATIONAL BUREAU OF STANDARDS 1980 CATALOG: A COMPILATION OF ABSTRACTS AND KEY WORDS AND AUTHOR INDEXES Report, Jan. - Dec. 1980
Betty L. Burris, ed. and Rebecca J. Morehouse, ed. Jun. 1981 664 p
(PB82-104688; NBS-SP-305-Suppl-12; LC-48-47112) Avail: NTIS HC A99/MF A01 CSCL 05B

The supplement lists the publications of the Bureau issued between January 1 - December 31, 1980. It includes an abstract of each publication, key word and author indexes; and general information and instructions about NBS publications. GRA

N82-18063# Council for Scientific and Industrial Research, Pretoria (South Africa).
TRAINING OF INFORMATION SPECIALISTS
1980 186 p refs In ENGLISH; partly in AFRIKAANS Presented at a Symp. Held at Pretoria, 6-7 May 1980
(PB82-103227) Avail: NTIS HC A09/MF A01 CSCL 05I

In the last decade a new industry has emerged from the conjunction of databases, computers, telecommunications and information retrieval programs. The growth of this industry is reviewed showing how the initial application of computers for production purposes produced new forms of information which allowed the development of computerized retrieval. The various trends in the database field are identified and the results of an economic modelling study are used to project future cost levels for searching databases online. This generates the need for increased training emphasis on knowing the databases if industry is to get maximum return from their use. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-18064# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONTRIBUTION OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE (UNISPACE)
Nelson deJesus Parada Jun. 1981 40 p
(INPE-2137-PPE/360) Avail: NTIS HC A03/MF A01

Space science activities are summarized. These consist of high energy astrophysics; radio astronomy and solar physics; geomagnetism; and ionosphere, upper atmosphere, and plasma physics. Space technology activities are reported. These consist of satellite technology, systems engineering, computer science and informatics, material science and technology, sensor systems, combustion, space geodesy, digital and analog systems, and telecommunication by satellite. Space applications activities are presented. These involve reception, processing and dissemination of images and data from meteorological satellites; meteorological instrumentation; meteorological applications; dynamic meteorology; image production; agronomy and forestry; ocean resources; environmental analysis; image processing and recognition; crop forecasting; and cartography. International cooperation is also considered. N.W.

N82-18065# Committee on Appropriations (U. S. House).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT - INDEPENDENT AGENCIES APPROPRIATION ACT, 1981
Washington GPO 1980 25 p H.R. 7631 enacted into law by the 96th Congr., 15 Dec. 1980

(Pub-Law-96-526; GPO-79-139) Avail: US Capitol, House Document Room

Appropriations are provided for the modernization of low income housing, rent supplements for housing for the elderly and handicapped. Monies are also appropriated for mortgage assistance, energy conservative home improvements, and community development projects. The bill also funds the Consumer Protection Safety Commission, Environmental Protection Agency activities, etc. S.L.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-18066*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

VEHICLE TEST REPORT: ELECTRIC VEHICLE ASSOCIATES ELECTRIC CONVERSION OF AN AMC PACER

Theodore W. Price, Vincent A. Wirth, Jr., and Michael F. Pompa 15 Oct. 1981 61 p refs

(Contracts NAS7-100; DE-AI01-78CS-54209)

(NASA-CR-168425; JPL-Pub-81-97; DOE/CS-54209/4) Avail: NTIS HC A04/ A01 CSCL 13F

Tests were performed to characterize certain parameters of the EVA Pacer and to provide baseline data that can be used for the comparison of improved batteries that may be incorporated into the vehicle at a later time. The vehicle tests were concentrated on the electrical drive subsystem; i.e., the batteries, controller and motor. The tests included coastdowns to characterize the road load, and range evaluations for both cyclic and constant speed conditions. A qualitative evaluation of the vehicle's performance was made by comparing its constant speed range performance with other electric and hybrid vehicles. The Pacer performance was approximately equal to the majority of those vehicles assessed in 1977. A.R.H.

N82-18067*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

UPGRADED DEMONSTRATION VEHICLE TASK REPORT

J. Bryant, K. Hardy, R. Livingston, and J. Sandberg 15 Oct. 1981 158 p refs

(Contracts NAS7-100; DE-AI01-78CS-54209)

(NASA-CR-168424; JPL-Pub-81-98; DOE/CS-54209/5) Avail: NTIS HC A08/MF A01 CSCL 13F

Vehicle/battery performance capabilities and interface problems that occurred when upgraded developmental batteries were integrated with upgraded versions of commercially available electric vehicles were investigated. Developmental batteries used included nickel zinc batteries, a nickel iron battery, and an improved lead acid battery. Testing of the electric vehicles and upgraded batteries was performed in the complete vehicle system environment to characterize performance and identify problems unique to the vehicle/battery system. Constant speed tests and driving schedule range tests were performed on a chassis dynamometer. The results from these tests of the upgraded batteries and vehicles were compared to performance capabilities for the same vehicles equipped with standard batteries. S.L.

N82-18068*# Department of Transportation, Cambridge, Mass.

FUEL ECONOMY AND EXHAUST EMISSIONS CHARACTERISTICS OF DIESEL VEHICLES: TEST RESULTS OF A PROTOTYPE FIAT 131TC 2.4 LITER AUTOMOBILE

S. S. Quayle Jan. 1982 58 p refs

(NASA Order C-32817-D; Contract DE-AI01-80CS-50194)

(NASA-CR-165535; DOE/NASA/2817-2; DOT-TSC-NASA-81-2) Avail: NTIS HC A04/MF A01 CSCL 13F

The results obtained from fuel economy and emission tests conducted on a prototype Fiat 131 turbocharged diesel vehicle are presented. The vehicle was tested on a chassis dynamometer over selected drive cycles and steady-state conditions. Two fuels were used, a United States number 2 diesel and a European diesel fuel. Particulate emission rates were calculated from dilution tunnel measurements and large volume particulate samples were collected for biological and chemical analysis. It was determined that turbocharging accompanied by complementary modifications results in small but substantial improvements in regulated emissions, fuel economy, and performance. Notably, particulate levels were reduced by 30 percent. Author

N82-18069*# Denver Univ., Colo. Transfer Research and Impact Studies Project.

NASA TECHNOLOGY UTILIZATION PROGRAM: THE SMALL BUSINESS MARKET Final Report

Jeanne K. Vannoy, Felipe Garcia-Otero, F. Douglas Johnson, and Eileen Staskin 1 Jul. 1980 115 p refs

(Contract NASw-3021)

(NASA-CR-168447) Avail: NTIS HC A06/MF A01 CSCL 05A

Technology transfer programs were studied to determine how they might be more useful to the small business community. The status, needs, and technology use patterns of small firms are reported. Small business problems and failures are considered. Innovation, capitalization, R and D, and market share problems are discussed. Pocket, captive, and new markets are summarized. Small manufacturers and technology acquisition are discussed, covering external and internal sources, and NASA technology. Small business and the technology utilization program are discussed, covering publications and industrial applications centers. Observations and recommendations include small business market development and contracting, and NASA management technology. N.W.

N82-18070# Open Univ., Milton (England). Energy Research Group.

COMMUNICATION AND INTEGRATION WITHIN THE AGRICULTURE WATER, WASTE, AND ENERGY INDUSTRIES

D. C. Andrews Sep. 1980 28 p refs

(ERG-033) Avail: NTIS HC A03/MF A01

The special area of interest lies in the possible benefits of integrating and coordinating the activities of the agriculture, water, waste and energy (AWWE) sectors, where large cash and energy savings seem possible. The integration of the AWWE sectors is a specific example, but the comments and methods suggested are general in their application to complex problem-solving areas. A general method is described which, compared with conventional research, makes the collection of information on potential integration and coordination of any complex activities much easier. It also makes it more likely that the information is relevant and correct but, above all, the method ensures that any useful results of the research will be brought to the attention of relevant policy makers, with therefore a better chance that such results will be acted upon. Lateral access networks are proposed as a general means of achieving these practical benefits. J.M.S.

N82-18071# McElroy (Ralph) Co., Austin, Tex.

POSSIBILITY FOR ENERGY CONSERVATION IN TRANSPORTING FREIGHT BY TRUCK

M. Millar Sep. 1981 20 p Transl. into ENGLISH from Symp. on Evaluation and Reinforcement of Pavements and Energy in Transportation, Argentina, 1980 p 121-30 Symp. held in San Miguel de Tucuman, Argentina, 4-6 Sep. 1980 Prepared for Argonne National Lab., Ill.

(Contract W-31-109-eng-38)

(DE81-030072; ANL-Trans-1199) Avail: NTIS HC A02/MF A01

Increasing energy efficiency in transporting freight by truck in interurban areas is discussed. Technical parameters to improve fuel economy are: (1) efficiency of the engine and drive train;(2) rolling resistance; (3) gross weight of the vehicle; (4) accessory load; and (5) aerodynamic resistance. Operating procedures to improve fuel economy are also discussed. Savings obtained up to the present in the USA due to the use of these various devices are summarized. DOE

N82-18072# Department of Energy, Washington, D. C. Office of Vehicle and Engine Research and Development.
ELECTRIC AND HYBRID VEHICLE PROGRAM Quarterly Report, Apr. - Jun. 1981
Aug. 1981 12 p
(DE82-000904; DOE/CE-0011/15) Avail: NTIS HC A02/MF A01

Development of engineering models of electronically commutated permanent magnet propulsion motors for electric vehicles is nearing completion. Tests on a samarium-cobalt motor and a ferrite motor were completed, a phase 1 ac propulsion system breadboard was installed on the road load simulator, lead-acid multicell modules surpassed 390 cycles in ongoing tests, and ongoing tests on nickel iron modules demonstrated greater than 670 cycles in one case, and 430 cycles in another. The final report of the environmental control system of the electric hybrid vehicle study recommends a split heat pump system. DOE

N82-18073# Open Univ., Milton (England). Energy Research Group.
ELECTRIC VEHICLE REFUELLING INFRASTRUCTURE
Mike Baker Oct. 1981 69 p refs
(ERG-038) Avail: NTIS HC A04/MF A01; Secy. Energy Research Group, Milton Keynes, England

Energy and economic aspects of refueling infrastructures required in 2025 by complete fleets of electric battery and coal derived liquid fuel powered road vehicles are compared. Data are drawn from a study of the United Kingdom. The electric car is cheaper than the liquid powered one. If battery exchange is discounted, all electric vehicles have lower fuel costs than their equivalent. The electric vehicle alternative shows a very large saving in both primary energy and running cost. It requires a much smaller installed electricity generating capacity whose load factor is such that it can be totally nuclear. Author (ESA)

N82-18074# Decision Group, Inc., McLean, Va.
INITIAL INTERFACE STANDARDS FOR RAPID TRANSIT CAR SUBSYSTEM COMPONENTS Final Technical Report
R. E. Morris, A. Pali, C. Urian, and W. Walker Jun. 1981 182 p
(Contract DOT-UT-70043)
(PB82-104704; UMTA-IT-06-0175-81-2) Avail: NTIS HC A09/MF A01 CSCL 13F

Initial interface standards for subsystem components of a typical rapid transit car system are presented. These standards were derived from an interface definition analysis of 128 product applications on seven of the newest North American rapid transit car system designs. Analysis of the product specific data provide the basis for either defining the functional and physical interfaces of each major component and the minimal space which must be allocated upon the carbody structure or truck frames to incorporate a major component into the carbody structural design, or determine that a major component does not appear to be amenable to interface standardization. Transit industry adoption of interface standards for car mounted equipment results in cars which cost less to build and own. GRA

N82-18075# New England River Basins Commission, Boston, Mass.
PROCEDURES FOR PREPARING REGIONAL TRANSPORTATION MANAGEMENT PLANS
Michael J. Goetz Aug. 1981 177 p refs
(Contract DI-AA851-IOA-51)
(PB82-106162) Avail: NTIS HC A09/MF A01 CSCL 13B

A set of procedures is presented to provide planners with a working framework for preparing regional transportation management plans. These plans are designed to insure the safe and timely transportation of oil and gas produced offshore to onshore processing and distribution systems. A case study application to the Georges Bank region of the North Atlantic outer continental shelf is included. GRA

N82-18076# SG Associates, Inc., Annandale, Va.
OPERATING COSTS AND CHARACTERISTICS OF MINIBUSES Final Report, Jan. - May 1981
Stephen J. Andrle, Frank Spielberg, and Arnie Hungerbuhler (Technology Research and Analysis Corp., Arlington, Va.) Aug. 1981 110 p refs
(Contract DTRS-557-81-C-00053)
(PB82-107038; UMTA-MA-06-0126-81-1; DOT-TSC-UMTA-81-35) Avail: NTIS HC A06/MF A01 CSCL 13B

An analysis of minibus operating characteristics based on operating data obtained from transit operators which use minibuses is presented. Eleven operators were contacted, and useful data were obtained from seven. The focus of this evaluation is on fixed route transit applications of minibuses. The intent of this analysis is to identify the costs of operating minibuses and the manner in which these costs vary. The report also seeks to clarify the conditions in which minibuses are the most cost effective buses to operate. Representative cost and operating statistics are shown for prototypical applications of minibuses in environments found to be appropriate. It makes little difference from a long term point of view whether purpose built or medium duty vehicles are selected. GRA

N82-18077# National Clearinghouse for Improving the Management of Human Services, Rockville, Md.
TECHNOLOGY TRANSFER AND THE MANAGEMENT OF HUMAN SERVICES
Aug. 1981 33 p Sponsored by Dept. of Health and Human Services
(Proj. SHARE)
(PB82-105644) Avail: NTIS HC A03/MF A01 CSCL 05K

The Project SHARE bibliography on technology transfer in the human services sector is an information resource selected to reflect recent research, demonstrations, transfer experiments, and experience in the human services field. It is a sample of the documentation on technology transfer, not an exhaustive listing of the literature in the field or in the Project SHARE data base. As such, it should be an aid to determining what technologies are available for transfer in human services as well as how transfer might be effectively implemented. GRA

N82-18078# Federal Highway Administration, Washington, D.C. Office of Research and Development.
A METHOD FOR ESTIMATING FUEL CONSUMPTION AND VEHICLE EMISSIONS ON URBAN ARTERIALS AND NETWORKS
Juri Raus Apr. 1981 60 p refs
(PB82-108523; FHWA/TS-81/210) Avail: NTIS HC A04/MF A01 CSCL 13F

A method to estimate motor vehicle fuel consumption and vehicle emissions in an urban driving environment which requires a minimum of field data collection and processing effort was developed. Average transient speed measured by travel time is a good composite parameter reflecting stops and slowdowns and is closely correlated with fuel consumption and vehicle emission rates. Data were obtained for fuel speed and emission speed profiles for a 1980 typical mix of passenger cars, single unit trucks, tractor trailers and busses. Data and computational procedure provide an approach for estimating fuel consumption and emissions and can be used to gain insight into existing traffic operations and the merits of proposed or actual flow improvements. GRA

N82-18079# Polytechnic Inst. of New York, Brooklyn. Transportation Training and Research Center.
URBAN DECENTRALIZATION AND THE ROLE OF PUBLIC TRANSPORTATION Final Report
Arnold J. Bloch and Louis J. Pignataro Jul. 1981 100 p refs 2 Vol.
(PB82-114844; UMTA-NY-11-0023-81-4) Avail: NTIS HC A05/MF A01 CSCL 13B

The opportunities and difficulties that are likely to occur during the near term if a transition is to be made in terms of the future directions of public transportation were examined. The recent transportation planning and implementation experiments in a number of urban areas were reviewed in order to discern how well urban America is prepared for a likely future scenario of continued population decentralization. T.M.

N82-18080# Polytechnic Inst. of New York, Brooklyn. Transportation Training and Research Center.
URBAN DECENTRALIZATION AND THE ROLE OF PUBLIC TRANSPORTATION. EXECUTIVE SUMMARY

Arnold J. Bloch and Louis J. Pignataro Jul. 1981 13 p 2 Vol.
(PB82-114836; UMTA-NY-11-0023-81-3) Avail: NTIS HC A02/MF A01 CSCL 13B

Five case studies were examined in detail in terms of growth patterns, land use policies toward growth and decentralization, and the types of public transportation projects planned or implemented. The case study urban areas are identified as follows: relatively declining urban areas--Boston, MA, and Rochester, NY; maturing sun belt growth--Atlanta, GA; and booming urban areas--Tampa, FL, and San Jose, CA. It was found that most projects were planned with an incomplete or inaccurate understanding of decentralization patterns, were not usually in concert with land use objectives, and others reflected unrealistic expectations of what public transportation services can perform. The recommendations center around a reformulation of the relationship between land use policy and public transportation in the future. GRA

N82-18081# Metcalf and Eddy, Inc., Palo Alto, Calif.
URBAN STORMWATER MANAGEMENT AND TECHNOLOGY: CASE STUDY IN SAN FRANCISCO Final Report, Sep. 1979 - May 1980
John A. Lager, Ranjit K. Advani, and Elizabeth M. Gowen Sep. 1981 59 p refs
(Contract EPA-68-03-2877)
(PB82-105594; EPA-600/2-81-204) Avail: NTIS HC A04/MF A01 CSCL 08H

Urban (CSO) management is discussed. San Francisco's experiences with the planning and design of CSO control and treatment facilities is presented. The development of the San Francisco combined sewer overflow control master plan a continuing process for treatment needs with the costs and environmental social impacts in a large urban area. GRA

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-18082 Princeton Univ., N. J.
A SEARCH FOR HALOS AROUND SPIRAL GALAXIES Ph.D. Thesis
Bernard Herman Siebers, Jr. 1981 127 p
Avail: Univ. Microfilms Order No. 8127760

An attempt to detect massive luminous halos around a total of 13 edge-on spiral galaxies is described. Observations were made in the wavelength bands 5000 A to 7000 A and 9000 A to 9500 A with a cooled charge coupled device. No halos are seen, and lower limits are set on the mass/light ratio of one galaxy in the 5000 A to 7000 A band and of four galaxies in the 9000 A to 9500 A band. The limits, taken together, imply that in these four galaxies a single stellar-type halo population would have to be made up of stars which are fainter than an M7 red dwarf. Dissert. Abstr.

N82-18083 Michigan Univ., Ann Arbor.
TWO-DIMENSIONAL PHOTOMETRY OF PLANETARY NEBULAE Ph.D. Thesis
Peter Nathan Kupferman 1981 298 p
Avail: Univ. Microfilms Order No. 8125148

Two-dimensional spectrophotometry is used to study problems of geometric structure, optical opacity, temperature variation, and density distribution for three planetary nebulae: NGC 7662, NGC 6720 and NGC 2392. Monochromatic images, using narrow band interference filters were taken using a linear intensified silicon vidicon and the Palomar 1.5 meter telescope. These digital images were used to construct two-dimensional maps of intensity, emissivity, electron temperature and electron density. The Abel transformation is used to solve for the volume emissivity. The distribution of O(0), He(+) and He(+) ions for these nebulae are used to test for optical opacity in the H I and He II Lyman continuua. Electron temperature maps indicate a radial monotonic drop of 2000 K for NGC 7662 and NGC 6720, while the distribution of NGC 2392 is more complex. Electron density maps indicate that knots in NGC 7662 are denser than the surrounding gas, while filaments in NGC 6720 are not. Dissert. Abstr.

N82-18084 Yale Univ., New Haven, Conn.
A PHOTOMETRIC SEARCH FOR WHITE DWARFS IN INTERMEDIATE-AGE OPEN CLUSTERS Ph.D. Thesis
Barbara Jean Anthony-Twarog 1981 247 p
Avail: Univ. Microfilms Order No. 8125653

Star clusters which represent coeval populations of stars, aged 20 to 700 million years old can be dated by the masses and spectroscopic properties of the surviving stars. Any white dwarf members may be assumed to have been originally more massive than these survivors. The open clusters IC 2602, NGC 6405, M 34 and Praesepe were surveyed and the results compared to related studies in other clusters. Photographic photometry was used as well as dispersion spectrophotometry. The evidence suggests that the upper limit for the masses of single star white dwarf precursors is about 5 solar masses. The requirements for faint photoelectric photometry, and spectroscopic confirmation of photometric candidates are stringent, as there may be contaminating populations of blue objects at all galactic latitudes. This result does not rule out white dwarf products of more massive binary systems. Dissert. Abstr.

N82-18085*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH ENERGY X-RAY OBSERVATIONS OF CYG X-3 FROM FROM OSO-8: FURTHER EVIDENCE OF A 34.1 DAY PERIOD
J. F. Dolan, C. J. Crannell, B. R. Dennis, K. J. Frost, and L. E. Orwig Nov. 1981 21 p refs
(NASA-TM-83862) Avail: NTIS HC A02/MF A01 CSCL 03A

The X-ray source Cyg X-3 (=4U2030+40) was observed with the high energy X-ray spectrometer on OSO-8 for two weeks in 1975 and in 1976 and for one week in 1977. No change in spectral shape and intensity above 23 keV was observed from year to year. No correlation is observed between the source's intensity and the phase of the 34.1 day period discovered by Molteni, et al. (1980). The pulsed fraction of the 4.8 hour light curve between 23 and 73 keV varies from week to week, however, and the magnitude of the pulsed fraction appears to be correlated with the 34.1 day phase. No immediate explanation of this behavior is apparent in terms of previously proposed models of the source. Author

N82-18086 Princeton Univ., N. J.
OPTICAL AND INFRARED SEARCH FOR MASSIVE HALOS OF GALAXIES Ph.D. Thesis
Peter Reed Saulson 1981 146 p
Avail: Univ. Microfilms Order No. 8127759

An investigation of the notion that galaxies are surrounded by massive halos made of very faint stars was made. A review of the evidence concerning the existence, mass, morphology, and composition of massive halos is given, along with a critical examination of previous attempts to detect the halos optically. A report is given of observations made in the R and I bands of four galaxies, using a charge-coupled device detector, which set stringent lower limits on the mass-to-light ratios of the massive halos. The results of new observations of the spiral galaxy NGC 4565 in the infrared K band are presented, showing that the halos must be made of material less luminous than the faintest known main sequence star, VB10. Finally, the implications of these observations for the nature of massive halos are discussed. Dissert. Abstr.

N82-18087 Michigan Univ., Ann Arbor.
A STUDY OF EXTRAGALACTIC SUPERNOVA REMNANTS

Ph.D. Thesis
William Patrick Blair 1981 149 p
Avail: Univ. Microfilms Order No. 8125071

Image tube photographs of eight fields in the nearby spiral galaxy M31, using interference filters that isolate the emission lines of H alpha + [NII] at lambda 6570A and [SII] lambda 6725A, revealed nebulae believed to be supernova remnants (SNRs). Spectroscopic observations were used to confirm this identification for twelve of these nebulae. The initial energy in each remnant had a mean value of E approximately equal to 3 x 10 to the 50th power ergs. Comparison of SNR spectra to shock wave models allowed estimates of nitrogen, oxygen and sulfur in the interstellar gas of M31. Eleven H II regions in M31 were observed for comparison to the SNRs. Element abundances were derived. The variation of abundances as a function of galactocentric distance in M31 were found to be similar to the abundance gradients in our own Galaxy. An emission region in the irregular galaxy NGC 4449 was also investigated. From optical spectrophotometry broad emission lines with widths that suggest an expansion at 3500 km 10 to the minus 1 power were found. About 0.1 solar mass of oxygen is present in the gas that is presently cooling. The absence of hydrogen suggests that nucleosynthesis was important in the star that created this remnant. Combining the optical data with X-ray observations provides a consistent overall picture of the interaction between the SNR and the H II region in which it is embedded. Dissert. Abstr.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-18088 Academy of Sciences (USSR), Moscow. Space Research Inst.
EFFECT OF CAPTURING OF HARD PHOTONS BY STRONG MAGNETIC FIELD AND THE ROLE IT MAY PLAY IN PULSARS
A. E. Shabad and V. V. Usov 1981 15 p refs Submitted for publication
(Rept-663) Copyright. Avail: Issuing Activity

The resonance effects near the threshold of creation of e(+),e(-) pairs by a gamma-quantum in a magnetic field B > or = 01. B sub Cr lead to the bending of its trajectory and to considerable increase of its free path. This removes the existing difficulties in explaining the luminosity of the Crab and Vela pulsars. Author

N82-18089 Academy of Sciences (USSR), Moscow. Space Research Inst.
DUST-LIKE STAGES IN THE EARLY UNIVERSE AND THE RESTRICTIONS ON THE PRIMORDIAL BLACK HOLE SPECTRUM
M. Yu. Khlopov and A. G. Polnarev 1981 27 p refs Submitted for publication
(Rept-646) Copyright. Avail: Issuing Activity

Early possible dust like stages of the universe are shown to result in softening of the restrictions on the fraction of matter contained in primordial black holes (PBH). Taking into account such softening, limits on the parameters of unified theories are given. The inhomogeneity of the early universe on a small scale, it is concluded, is made compatible with modern observational limits on the PBH spectrum. Author

N82-18090 Academy of Sciences (USSR), Moscow. Space Research Inst.
ORIGIN OF THE INITIAL INHOMOGENEITIES OF THE UNIVERSE
D. A. Kompaneets, V. N. Lukash, and I. D. Novikov 1981 36 p refs Presented at the Conf. on Origin of the Struct. of the Universe, Tallin, 6-10 Apr. 1981 Submitted for publication
(Rept-652) Copyright. Avail: Issuing Activity

The problem of the origin of small inhomogeneities in the expanding Universe and their evolution near the cosmological singularity is analyzed. All physical fluctuation modes, it is hypothesized, have an equal energy at the initial moment t sub 0 (equipartition hypothesis). This hypothesis implies quite a different relation between the initial perturbation modes than assumed earlier. The mechanisms of amplification of the potential perturbations near the cosmological singularity, it is shown, results in the significant growth of the initial fluctuations. The initial value of the amplitude of the perturbations is made possible by tens of orders of magnitude less than asummed earlier. A physical interpretation of the amplification mechanism is given. The conclusions are applied to the problem of the formation of the large scale structure of the Universe. N.W.

N82-18091 Academy of Sciences (USSR), Moscow. Space Research Inst.
ELECTRIC CHARGE IN THE KRUSKAL SPACE-TIME AND THE JEANS CONJECTURE
M. Demianski (Warsaw Univ.) and I. D. Novikov 1981 31 p refs Submitted for publication
(Rept-653) Copyright. Avail: Issuing Activity

An attempt was made to realize Jeans' conjecture that there might be regions in space, such as galactic centers, where matter could be flowing into our universe from other universes. Studies of a test electromagnetic field produced by a point charge in the maximally extended Schwarzschild space-time, show that an observer at infinity can always get information on the value of the charge, even if it is hidden inside a white hole. It is concluded that the Jean conjecture cannot be realized in this manner. A.R.H.

N82-18092 Texas Univ. at Arlington.
A SPECTROSCOPIC STUDY OF THE RADIAL VELOCITY VARIATIONS AND ACCRETION DISKS FOUND IN FOUR DWARF NOVAE Ph.D. Thesis
Richard James Stover 1981 276 p
Avail: Univ. Microfilms Order No. 8119381

Time resolved spectroscopic observations of the four dwarf novae SS Cyg, EM Cyg, U Gem, and RU Peg are presented. Although these systems were studied previously, all of the spectroscopic studies were done photographically. A linear response, digital detector is employed. Analytic techniques to the study of the radial velocity variations and emission line profiles found in dwarf novae are applied. In the study of SS Cyg cross-correlation techniques were used for the first time to measure the radial velocity variations of the secondary star absorption lines. In the study of U Gem, analysis of the accretion disk emission lines showed that the motion of the material in the disk cannot be described accurately by orbits defined within the three-body approximation. The observations of EM Cyg reveal an unstable accretion disk, with emission lines that vary erratically on timescales of minutes to days. New measurements of the radial velocity variations of the emission and absorption lines found in the spectrum of RU Peg agree with previous measurements but have a higher accuracy. Dissert. Abstr.

N82-18093 Yale Univ., New Haven, Conn.
GRAVITATIONAL WAVE GENERATION BY STELLAR CORE COLLAPSE Ph.D. Thesis
Thomas Andrew Moore 1981 149 p
Avail: Univ. Microfilms Order No. 8126359

A model of stellar core collapse which treats deviations from spherical symmetry as small perturbations on a spherical background is presented. It may be used to predict qualitative and quantitative features of the gravitational radiation emitted by stellar cores with odd-parity, axisymmetric fluid perturations, and more general asymmetries. The present consensus on the physics of core collapse is reviewed, and the important features, assumptions, and limitations of the model are outlined. A series of model runs are presented and discussed. Several proposals for future research are presented. The mathematical features of the present model and its realization on the computer are explored. Dissert. Abstr.

N82-18094 Princeton Univ., N. J.
COMPONENTS IN THE INTERSTELLAR MEDIUM Ph.D. Thesis
Eric Russell Martin 1981 165 p
Avail: Univ. Microfilms Order No. 8127758

The lines of sight toward 32 stars with a procedure that gives velocity components for various interstellar ions are analyzed.

The column densities found for species expected to be relatively undepleted are used to estimate the column density of neutral hydrogen in each component. Whenever possible, the molecular hydrogen excitation temperature, abundances (relative to S II), electron density, and hydrogen volume density are calculated for each component. The results for each star are combined to give total H I column density as a function of (LSR) velocity. The derived velocities correspond well with those found in optical studies. The mean electron density is found to be approximately constant with velocity, but the mean hydrogen volume density is found to vary. The data presented here are consistent with the assumption that some of the velocity components are due to circumstellar material. Dissert. Abstr.

N82-18095*# Wisconsin Univ., Madison. Space Physics Lab.
EXTENDED ADIABATIC BLAST WAVES AND A MODEL OF THE SOFT X-RAY BACKGROUND
Donald P. Cox and Paul R. Anderson (California Univ., Santa Barbara) Aug. 1981 85 p refs
(Grant NGL-50-002-044)
(NASA-CR-168411; Rept-137) Avail: NTIS HC A05/MF A01 CSCL 03B

An analytical approximation is generated which follows the development of an adiabatic spherical blast wave in a homogeneous ambient medium of finite pressure. An analytical approximation is also presented for the electron temperature distribution resulting from coulomb collisional heating. The dynamical, thermal, ionization, and spectral structures are calculated for blast waves of energy E sub 0 = 5 x 10 to the 50th power ergs in a hot low-density interstellar environment. A formula is presented for estimating the luminosity evolution of such explosions. The B and C bands of the soft X-ray background, it is shown, are reproduced by such a model explosion if the ambient density is about .000004 cm, the blast radius is roughly 100 pc, and the solar system is located inside the shocked region. Evolution in a pre-existing cavity with a strong density gradient may, it is suggested, remove both the M band and OVI discrepancies. N.W.

N82-18096*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DISTRIBUTION OF FREE ELECTRONS IN THE INNER GALAXY FROM PULSAR DISPERSION MEASURES
David S. Harding and Alice K. Harding Dec. 1981 33 p refs Submitted for publication
(NASA-TM-83875) Avail: NTIS HC A03/MF A01 CSCL 03B

The dispersion measures of a sample of 149 pulsars in the inner Galaxy (absolute value of l < 50 deg) were statistically analyzed to deduce the large-scale distribution of free thermal electrons in this region. The dispersion measure distribution of these pulsars shows significant evidence for a decrease in the electron scale height from a local value greater than the pulsar scale height to a value less than the pulsar scale height at galactocentric radii inside of approximately 7 kpc. An increase in the electron density (to a value around .15/cu cm at 4 to 5 kpc) must accompany such a decrease in scale height. There is also evidence for a large-scale warp in the electron distribution below the b + 0 deg plane inside the Solar circle. A model is proposed for the electron distribution which incorporates these features and Monte Carlo generated dispersion measure distributions are presented for parameters which best reproduce the observed pulsar distributions. M.G.

N82-18097# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIAL EVOLUTION OF POWER SPECTRA OF INTERPLANETARY ALFVENIC TURBULENCE
B. Bavassano (Istituto di Ricerca e Technologi a per lo Studio del Plasma Nello Spazio, Rome), M. Dobrowolny (Istituto di Ricerca e Technologia per lo Studio del Plasma Nello Spazio, Rome), F. Mariani (Rome Univ.), and N. F. Ness Sep. 1981 28 p refs
(IPS-81-13) Avail: NTIS HC A03/MF A01

The radial evolution of the power spectra of the MHD turbulence within the trailing edge of high speed streams in the solar wind was investigated with the magnetic field data of Helios 1 and 2 for heliocentric distance between 0.3 and 0.9 AU. In the analyzed frequency range (.00028 Hz to .0083 Hz) the computed spectra have, near the Earth, values of the spectral index close to that predicted for an incompressible hydromagnetic turbulence in a stationary state. Approaching the Sun the spectral slope remains unchanged for frequencies f > or approximately .00 Hz, whereas at lower frequencies, a clear evolution toward a less steep fall off with frequency is found. The radial gradient of the power in Alfvenic fluctuations depends on frequency and it increases upon increasing frequency. For frequencies f > or approximately .00 Hz, however, the radial gradient remains approximately the same. Possible theoretical implications of the observational features are discussed. Author

N82-18098# Technische Universitaet, Munich (West Germany). Sonderforschungsbereich 78 Satellitengeodaesie.
MATERIAL ON THE DYNAMICS OF EARTH-MOON SYSTEMS: PLANETARY LIBRATION, FUNDAMENTALS [MATERIALIEN ZUR DINAMIK DES ERDE-MOND-SYSTEMS: LIBRATIONENIDES MONDES, GRUNDBEGRIFFE]
Karlheinz Goller, Heinrich Goeixner, and Manfred Schneider 1981 43 p refs In GERMAN Sponsored by Deutschen Forschungsgemeinschaft
(Mitt-155) Avail: NTIS HC A03/MF A01

Basic concepts on the optical and physical libration fundamentals of the Moon are analyzed. Optical libration is defined and ecliptic and equatorial lunar coordinates are discussed. Celestial mechanics of the physical libration theory based on Cassini's laws are defined. Linearized gyro equations are outlined in libration angles, directional cosines which are applicable to aeromechanics of angles of roll, yaw, and pitch which are connected with the distribution of variables. E.A.K.

N82-18099# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
THE ROLE OF CYCLOTRON RESONANCE PROCESSES IN THE SPECTRA OF ACCRETING NEUTRON STARS
Joachim Truemper 1981 11 p refs Presented at Workshop on Gamma-Ray Transients and Related Astrophys. Phenomena, San Diego, Calif., 5-8 Aug. 1981
(ISSN-0340-8922) Avail: NTIS HC A02/MF A01

The theory and observation of cyclotron resonance features in pulsating source spectra are reviewed, and gamma ray bursts are discussed. Scintillation counter, proportional counter, and cooled Ge spectrometer data confirm a first harmonic spectral feature in Her X-1, but not a second one in the 1976 observations. A large number of gamma ray burst sources are neutron stars with magnetic fields of 3 to 8 X 10 to the 12th power Gauss. The sources show extreme temperature stratification (10 to several 100 KeV). Column density range of the absorbing/scattering layers in the sources is narrow. Author (ESA)

N82-18100# Oxford Univ. (England). Nuclear Physics Lab.
THE ORIGIN OF NULLS MODE CHANGES AND TIMING NOISE IN PULSARS
P. B. Jones 1981 14 p refs
(PB82-115221; Rept-74/81) Avail: NTIS HC A02/MF A01 CSCL 03B

A solvable polar cap model obtained previously has normal states which may be associated with radio emission and null states. The solutions cannot be time-independent; the neutron star surface temperature T and mean surface nuclear charge Z are both functions of time. The normal and null states, and the transitions between them, form closed cycles in the T-Z plane. Normal-null transitions can occur inside a fraction of the area on the neutron star surface intersected by open magnetic flux lines. The fraction increases with pulsar period and becomes unity when the pulsar nears extinction. Frequency noise, mode changes, and pulse nulls have a common explanation in the transitions. GRA

N82-18101 State Univ. of New York at Stony Brook.
H2 EMISSION IN MOLECULAR CLOUDS Ph.D. Thesis
Jacqueline Fischer 1981 123 p
Avail: Univ. Microfilms Order No. 8127104

By observation in the 2 micron lines of vibrationally excited H2, H2 emission near a variety of types of very young objects was detected in the DR21/W75, NGC 7538, OMC-2, NGC 6334 and NGC 1999(HH2) molecular clouds. The observed v = 1.0 S(1)

line luminosities range from 0.006 solar luminosity to 2 solar luminosity. Observations in the CO(J = 1.0) line (lambda = 2.6 mm) indicate that all the H2 emission sources, with the exception of the Herbig Haro Object Number 2, are associated with enhanced high velocity wing emission (v nv approximately 7.20 km sec 10 to the minus 1 power) indicative of very supersonic gas flows. For most of the sources, the energy (approximately 10 to the 46th - 10 to the 47th power ergs sec 10 to the minus 1 power) and the momentum (approximately 10 to the minus 1 power g cm 10 to the minus 1 power) observed in the high velocity gas are under the assumption of shock excitation. The line ratios in DR21/H2 are inconsistent with pure ultraviolet excitation and derive an excitation temperature of 1700 K plus or minus 1100 K. The region of broad wing emission in DR21 is more compact than originally reported and the H2 emission region lies ust outside the half power radius of the blue blue-wing emission. Dissert. Abstr.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-18102 Academy of Sciences (USSR), Moscow. Space Research Inst.
THREE-DIMENSIONAL SHAPE AND POSITION OF VENUS'S BOW SHOCK
V. N. Smirnov, O. L. Vaisberg, S. A. Romenov, J. A. Slavin, C. T. Russel, and D. S. Intriligator 1981 29 p refs
(Rept-656) Copyright. Avail: Issuing Activity

The results of determination of the shock front position near Venus according to the Venera-9, 10 and Pioneer-Venus data are compared. It is shown that the presence of an asymmetry of the three dimensional form of the shock wave and its position in the ecliptic plane makes possible the explanation of the recently obtained discrepancy in determining the front position based on the data from the Venera and Pioneer-Venus data. Both the identified asymmetry of the shock wave form and the rotation of its axis of symmetry in the ecliptic plane additionally at an angle of 7.5 deg are probably associated with the interplanetary magnetic field influence. Author

N82-18103 California Univ., San Diego.
INTERACTIONS OF COMETS WITH THE SOLAR WIND AND SOLAR RADIATION Ph.D. Thesis
Harry Louis Francis Houpis 1981 347 p
Avail: Univ. Microfilms Order No. 8125439

A basic flow model was developed which uses the Newtonian thin layer approximation for the interaction between two adiabatic hypersonic systems to derive the three dimensional axisymmetric flow structure of the cometary ionosphere. The supersonic outflow of the cometary ions is braked and diverted to the tail by an inner shock whose size and shape is determined analytically. The layer between the inner shock and the tangential discontinuity surface is found to be somewhat thin near the symmetry axis, being about .23 of the inner shock nuclear distance. The effects of sunward jets observed in several comets on the structure of the layer were studied. It is shown that the jets tend to broaden the shock layer both near the axis and toward the flanks. The strong activity of comet Humason (1962 VIII) is explained. The production of dust from comets at large heliocentric distances is considered with particular emphasis placed on the extended dust coma observed in comet Bowell (1980b) at 7.17 AU. Dissert. Abstr.

N82-18104*# Illinois Univ., Urbana. Dept. of Astronomy.
EARTH-BASED REMOTE SENSING OF PLANETARY SURFACES AND ATMOSPHERES AT RADIO WAVELENGTHS
John R. Dickel [1982] 36 p refs Sponsored by NASA
(NASA-CR-168414) Avail: NTIS HC A03/MF A01 CSCL 03B

Two reasons for remote sensing from the Earth are given: (1) space exploration, particularly below the surfaces or underneath cloud layers, is limited to only a very few planets; and (2) a program of regular monitoring, currently impractical with a limited number of space probes, is required. Reflected solar and nonthermal radiation are discussed. Relativistic electrons, trapped in large magnetospheres on Saturn and Jupiter, are discussed. These electrons produce synchrotron radiation and also interact with the ionosphere to produce bursts of low frequency emission. Because most objects are black-bodies, continuum radiometry is emphasized. Spectroscopic techniques and the measurement of nonthermal emission are also discussed. N.W.

N82-18105*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VOYAGER 1 ASSESSMENT OF JUPITER'S PLANETARY MAGNETIC FIELD
J. E. P. Connerney, M. H. Acuna, and N. F. Ness Dec. 1981 20 p refs Submitted for publication
(NASA-TM-83882) Avail: NTIS HC A02/MF A01 CSCL 03B

An estimate of Jupiter's planetary magnetic field is obtained from the Voyager 1 observations of the Jovian magnetosphere. An explicit model for the magnetodisc current system is combined with a spherical harmonic model of the planetary field with both sets of parameters determined simultaneously using a nonlinear generalized inverse methodology. The resulting model fits the observations extremely well throughout the analysis interval ($r > 20$ Jovian radii). The Jovian internal field model obtained from the Voyager 1 data is very similar to the octopole Pioneer 11 models. The best fitting magnetodisc lies in the centrifugal equator, 2/3 of the way between the rotational and magnetic equators, as appropriate for centrifugal loading of the magnetosphere by a cold plasma. S.L.

N82-18106*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVIDENCE FOR A DISTANT (< 8700 R SUB J) JOVIAN MAGNETOTAIL: VOYAGER 2 OBSERVATIONS
R. P. Lepping, L. F. Burlaga, M. D. Desch, and L. W. Klein (Computer Sciences Corp., Silver Spring, Md.) Jan. 1982 20 p refs Submitted for publication
(NASA-TM-83881) Avail: NTIS HC A02/MF A01 CSCL 03B

A correlative survey of magnetometer (MAG) and Planetary Radio Astronomy (PRA) 1.2 kHz continuum radiation measurements from Voyager 2 provide evidence for at least eight distant Jovian magnetotail sightings occurring about once a month over the first 2/3 of 1981 at distances of approximately 5,000 to 9,000 R sub J. The occurrences of these events are in good agreement with prior Plasma Wave Science and Plasma Science identifications. Observations of these distant magnetotail, or tail filament, encounters appear most prevalent in both MAC and PRA data sets when the spacecraft was closest to the Jupiter-Sun axis at approximately 6,500 R sub J from the planet; the PRA events are also most intense during those times. A specific tail encounter occurring in mid-February 1981 is analyzed and shown to possess a remarkably symmetric magnetic field signature and to have a bipolar field structure in the central region. The bipolarity is characteristic of most of the eight events. Author

N82-18107# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
THE PRESENT PICTURE OF IO'S ELECTRODYNAMIC COUPLING WITH THE MAGNETOSPHERE OF JUPITER
M. Dobrowolny May 1981 23 p refs
(IPS-81-6) Avail: NTIS HC A02/MF A01

Theoretical models of Io-Jovian magnetosphere interaction are reviewed and Voyager 1 data are analyzed. Magnetic field measurements, Io's plasma torus, and radio measurements are discussed. Magnetic measurements prove the existence of an Alfven wave current system associated with Io. The multiplicity of decametric arcs during one Jupiter rotation is correlated with the multiple Alfven wave system installed by Io around Jupiter. The separation between waves falls in the same range as temporal separation between arcs. The width of an arc agrees well with the width of the corresponding Alfven wings. These associations

are phenomenological, and do not constitute a theory of Io's controlled decametric emissions. Author (ESA)

N82-18108# Chalmers Univ. of Technology, Goteborg (Sweden). Research Lab. of Electronics.
COMETS, INTERSTELLAR MOLECULES AND THE ORIGIN OF LIFE
William M. Irvine and Ake Hjalmarson 1981 34 p refs Submitted for publication
(PB82-104274; RR-143) Avail: NTIS HC AC3/MF A01 CSCL 03B

Comets and the relative abundance of molecules in the gas phase in interstellar clouds are investigated. The justification for a joint treatment lies in the possibility that comets may consist of a frozen matrix of interstellar volatiles and grains formed during the early stages of the collapse of the molecular cloud which ultimately produced the Sun and planets. These topics may in turn be related to the origin of life. The observed properties of comets and current models of their nature and composition are reviewed. The determination of relative molecular abundance in interstellar clouds and the evidence favoring a primarily gas phase chemistry in such regions, concluding with a tabulation of molecular abundances in the cold cloud known as TMC-1 which has been called a protosolar nebula is discussed. GRA

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-18109 Columbia Univ., New York.
SOLAR X-RAY FLARES: SPECTROSCOPIC RESULTS FROM THE EIGHTH ORBITING SOLAR OBSERVATORY AND THE DEVELOPMENT OF A SPACE SHUTTLE BORNE POLARIMETER Ph.D. Thesis
James Randall Lemen 1981 292 p
Avail: Univ. Microfilms Order No. 8125331

Observations made with spectrometers on board the OSO-8 satellite which observed flares during the previous solar minimum period are discussed. The high reflectivity of the crystal spectrometers enabled the observation of the X-ray continuum through all phases of flare development. Various coronal cooling theories were investigated by surveying 30 solar flares. It is shown that neither radiative nor conductive cooling models alone are capable of explaining the majority of events observed. A viable cooling model probably must also include convection. A polarimeter, built and scheduled to fly on the fourth test flight of the space shuttle is described. It has a bandwidth of 5 to 30 kiloelectron volts and is sufficiently sensitive to measure polarization with an accuracy of 1 to 2 percent over times as short as 10 seconds. Dissert. Abstr.

N82-18110 Institut d'Aeronomie Spatiale de Belgique, Brussels.
DIFFERENCES BETWEEN SOLAR WIND PLASMOIDS AND IDEAL MAGNETOHYDRODYNAMIC FILAMENTS
J. Lemaire and M. Roth 1981 24 p refs Submitted for publication
(Aeronomica-Acta-A-232-1981) Avail: Issuing Activity

The time dependent impulsive penetration model of solar wind plasma-magnetosphere interaction is elaborated on in order to emphasize its differences from ideal MHD models. The plasma-magnetic field entities differ from ideal MHD filaments. Their skin is not infinitely thin, but has a physical thickness determined by the gyromotion of the thermal ions and electrons. They are finite and their magnetic flux is interconnected with the interplanetary magnetic flux. When they penetrate into the magnetosphere their magnetic field lines become rooted in the ionosphere, i.e., in a medium with finite transverse conductivity. The external Lorentz force acting on their boundary surface depends on the orientation of their magnetic moment with respect to the external magnetic field. When their mechanical equilibrium is perturbed, hydromagnetic oscillations can be generated. The front side of all solar wind plasmoids which penetrate into the magnetosphere is considered to be the inner edge of the magnetospheric boundary layer, while the magnetopause is the surface where the magnetospheric plasma ceases to have a trapped pitch angle distribution. Author (ESA)

N82-18111*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
THERMAL PERTURBATION OF THE SUN
L. W. Twigg and A. S. Endal [1982] 9 p refs
(Grant NAG5-13)
(NASA-CR-168459) Avail: NTIS HC A02/MF A01 CSCL 03B

Thermal perturbations of the solar convection zone can be modeled (to the first order) by perturbing the mixing length parameter alpha (equal to the ratio of the mixing length to the pressure scale height) used in the standard mixing length theory of convection. Results of such an analysis are presented and discussed in relation to recent work by others. A.R.H.

N82-18112*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
EVOLUTIONARY VARIATIONS OF SOLAR LUMINOSITY
A. S. Endal [1982] 11 p refs
(Grants NAG5-13; NSF AST-79-19688)
Avail: NTIS HC A02/MF A01 CSCL 03B

The Theoretical arguments for a 30% increase in the solar luminosity over the past 4.7 billion years are reviewed. A scaling argument shows that this increase can be predicted without detailed numerical calculations. The magnitude of the increase is independent of nuclear reaction rates, as long as conversion of hydrogen to helium provides the basic energy source of the Sun. The effect of the solar luminosity increase on the terrestrial climate is briefly considered. It appears unlikely that an enhanced greenhouse effect, due to reduced gases (NH3, CH4), can account for the long-term paleoclimatic trends. Author

N82-18113*# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
THE EFFECT OF PERTURBATIONS OF CONVECTIVE ENERGY TRANSPORT ON THE LUMINOSITY AND RADIUS OF THE SUN
A. S. Endal and L. W. Twigg [1982] 39 p refs
(Grant NAG5-13)
(NASA-CR-168445) Avail: NTIS HC A03/MF A01 CSCL 03B

The response of solar models to perturbations of the efficiency of convective energy transport is studied for a number of cases. Such perturbations primarily effect the shallow superadiabatic layer of the convective envelope (at depth of approx. > 1000 km below the photosphere). Independent of the details of the perturbation scheme, the resulting change in the solar radius is always very small compared to the change in luminosity. This appears to be true for any physical mechanism of solar variability which operates in the outer layers of the convection zone. Changes of the solar radius have been inferred from historical observations of solar eclipses. Considering the constraints on concurrent luminosity changes, this type of solar variability must be indicative of changes in the solar structure at substantial depths below the superadiabatic layer of the convective envelope. Author

N82-18114# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Environmental Data and Information Service.
SOLAR-GEOPHYSICAL DATA NUMBER 442. PART 2: COMPREHENSIVE REPORTS, DATA FOR DECEMBER 1980, NOVEMBER 1979, MISCELLANEA
Helen E. Coffey Jun. 1981 91 p 2 Vol.
(PB82-106337; SGD-442-Pt-2; NOAA-81080303) Avail: NTIS HC A05/MF A01 CSCL 03B

In addition to an index for 1980 - 1981, this issue of comprehensive reports provides data on: solar radio emission, solar X-ray radiation, and mass ejections from the Sun. A new schedule will cause the daily flare index and the regional flare index to appear 13 and 14 months from the date of observation. This issue contains data on solar flares. Miscellaneous data includes: active regions synoptic solar maps, and the regional flares index. GRA

N82-18115# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Environmental Data and Information Service.

SOLAR-GEOPHYSICAL DATA NUMBER 442. PART 2: PROMPT REPORTS, DATA FOR MAY 1981, APRIL 1981 AND LATE DATA

Helen E. Coffey Jun. 1981 186 p 2 Vol.
(PB82-106329; SGD-442-Pt-1; NOAA-81080302) Avail: NTIS HC A09/MF A01 CSCL 03B

In addition to an index this report provides data on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field, spacecraft observations and Boulder geomagnetic substorm log. It also provides data on: daily solar activity centers, sudden ionospheric disturbances, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices. Late data includes solar radio emission, solar wind measurements, Spacecraft observations, Sudden ionosheric disturbances, cosmic rays, and geomagnetic indices.
GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-18116# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

COSMIC RAY NM-64 NEUTRON MONITOR DATA-4

G. Villoresi, N. L. Zangrilli, A. Felici, F. Re, and F. Signoretti Jun. 1981 32 p refs Prepared in cooperation with Rome Univ.
(IPS-81-9) Avail: NTIS HC A03/MF A01

Pressure-corrected data from the Rome neutron monitor as well as barometric pressure data are given in tabular form for the year 1979, together with the graphs of the corrected intensity. Details on the devices employed, operational mode and data handling are given.
Author

N82-18117*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

STATISTICAL PROPERTIES OF MHD FLUCTUATIONS ASSOCIATED WITH HIGH SPEED STREAMS FROM HELIOS 2 OBSERVATIONS

B. Bavassano (Inst. Plasma Spazio, Frascati, Italy), H. Dobrowolny (Inst. Plasma Spazio, Frascati, Italy), G. Fanfoni (Rome Univ.), F. Mariani (Inst. Plasma Spazio, Frascati, Italy), and N. F. Ness May 1981 29 p refs
(IPS-81-5) Avail: NTIS HC A03/MF A01

Helios 2 magnetic data were used to obtain several statistical properties of MHD fluctuations associated with the trailing edge of a given stream served in different solar rotations. Eigenvalues and eigenvectors of the variance matrix, total power and degree of compressibility of the fluctuations were derived and discussed both as a function of distance from the Sun and as a function of the frequency range included in the sample. The results obtained add new information to the picture of MHD turbulence in the solar wind. In particular, a dependence from frequency range of the radial gradients of various statistical quantities is obtained.
Author

N82-17241# Joint Publications Research Service, Arlington, Va.

GAMMA-RAY INSTRUMENTATION AND ITS USES IN SPACE

V. G. Kirillov-Ugryumov, R. Z. Sagdeyev, and Yu. P. Semenov *In its* USSR Rept.: Space, No. 14 (JPRS-79711) 22 Dec. 1981 p 42-50 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 4, Jul. - Aug. 1981 p 4-8 (For primary document see N82-17235 08-12)
Avail: NTIS HC A05/MF A01

99 GENERAL

N82-18118# Office of Naval Research, San Francisco, Calif.

ONR TOKYO SCIENTIFIC BULLETIN. VOLUME 6: NUMBER 3, JULY TO SEPTEMBER 1981

Young B. Kim and Mary Lou Moore Sep. 1981 86 p
(AD-A107649) Avail: NTIS HC A05/MF A01 CSCL 07/4

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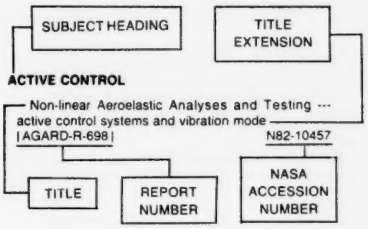

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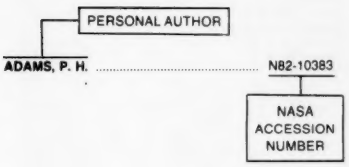

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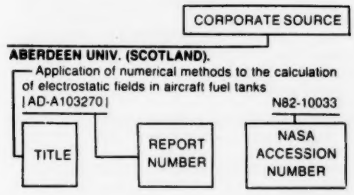

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Minerals yearbook, 1978-79. Volume 2: Area reports, Domestic
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CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
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CALIFORNIA UNIV., LOS ANGELES.
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CENTRE TECHNIQUE DES INDUSTRIES MECANIQUES, NANTES (FRANCE).
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Prospects for materials (plastics, elastomers, paints). Volume 5: Paints
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CONVEC: A computer program for transient incompressible fluid flow based on quadratic finite elements. Part 1: Theoretical aspects [EUR-7427/I-EN-VOL-1] N82-17460
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COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
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DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
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DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
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DEFENSE COMMUNICATIONS ENGINEERING CENTER, RESTON, VA.
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DENVER UNIV., COLO.
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DEPARTMENT OF ENERGY, WASHINGTON, D. C.
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DEPARTMENT OF TRANSPORTATION, CAMBRIDGE, MASS.
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DESERT RESEARCH INST., RENO, NEV.
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Thermally-induced ventilation applications in atria: A state-of-the-art report
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Optical thin film coatings
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EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Investigation of a laminar two-component boundary layer along an evaporation liquid film by means of a finite difference method
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INSTITUUT TNO VOOR WISKUNDE, INFORMATIEVERWERKING EN STATISTIEK, THE HAGUE (NETHERLANDS).
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USSR report: Space, no. 14
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N

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NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
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NATIONAL CLEARINGHOUSE FOR IMPROVING THE MANAGEMENT OF HUMAN SERVICES, ROCKVILLE, MD.
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NATIONAL COMMUNICATIONS SYSTEM, WASHINGTON, D. C.
Open Systems Interconnection (OSI) reference model (Aug. 1981) (ISO second Draft Proposal (DP) 7498)
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NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.
Solar-geophysical data number 442. Part 2: Comprehensive reports, Data for December 1980, November 1979, miscellanea
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
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NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
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NATO COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY, BRUSSELS (BELGIUM).
NATO-CCMS pilot study on disposal of hazardous wastes. Project: Thermal treatment. Project leader: Federal Republic of Germany
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NATO-CCMS pilot study on disposal of hazardous wastes: Chemical, physical, and biological treatment of hazardous wastes in NATO countries. Project leader: United States
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NATO-CCMS pilot study on disposal of hazardous wastes. Project: Landfill research. Project leader: Canada
[PB82-114547] N82-17693
NATO-CCMS pilot study on disposal of hazardous wastes: Metal finishing wastes. Project leader: France
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NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
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NAVAL OCEANOGRAPHIC OFFICE, BAY ST. LOUIS, MISS.
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NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
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NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
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NAVAL UNDERWATER SYSTEMS CENTER, NEWPORT, R.I.
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NAVAL WEAPONS SUPPORT CENTER, CRANE, IND.
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Water for non-nuclear energy development in the Great Basin
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Dredging management: Data and analysis for the New England/Long Island Sound region
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[PB82-105818] N82-17579
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[PB82-105925] N82-17590
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NEW ENGLAND UNIV., ARMIDALE (AUSTRALIA).
Meteorological services in agronomic and economic evaluations of risk N82-17760

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Development of mobility control methods to improve oil recovery by CO2
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NEW YORK SEA GRANT INST., ALBANY.
Sea grant maritime heritage series: The bight of the big apple
[PB82-119439] N82-17685
NEW YORK STATE DEPT. OF TRANSPORTATION, ALBANY.
Groove depth requirements for tine-textured rigid pavement 5: Durability of tine texturing on PCC pavements
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NEW YORK UNIV., N. Y.
Computational methods for the nuclear- and neutron-matter problems
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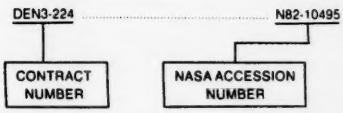

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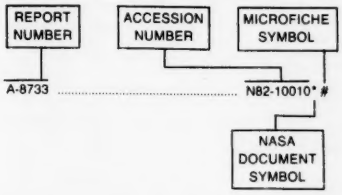

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